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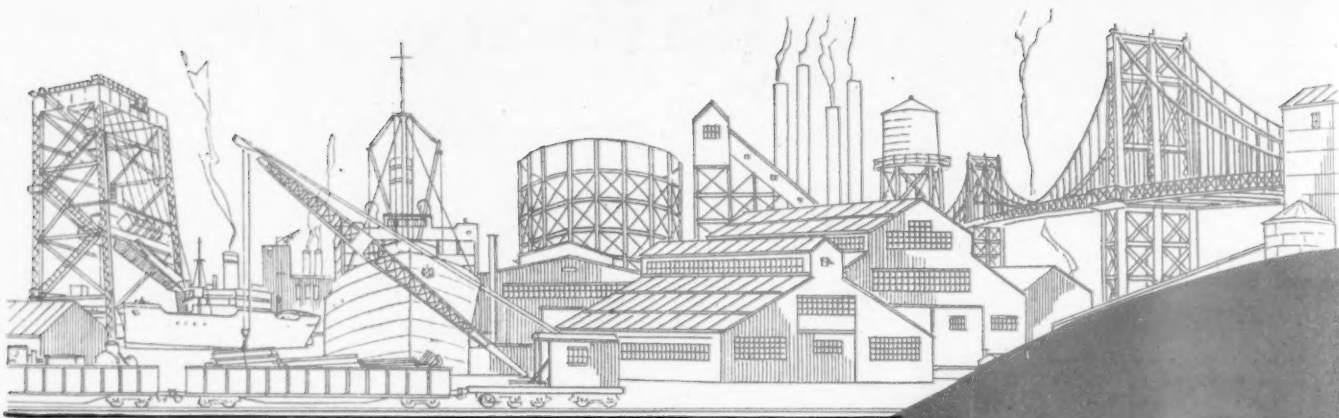
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## WHERE **RED** SIGNALS SAFETY



**W**HEN the construction of a gas tank, a railroad bridge, a ship's hull or any other metal structure has entailed the expenditure of thousands of dollars, then it is only logical that the greatest care should be exercised in the selection of paint materials employed to preserve that value.

Dampness, gases and weather say "Forward March" to corrosion. But red-lead says "Halt." That's why "red signals safety" when the red is red-lead.

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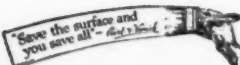
Dutch Boy Red-Lead comes in both paste and liquid forms. The paste—Red-Lead-in-oil—is easily thinned to brushing consistency. It is sold in the natural orange-red and can be readily tinted to darker shades.

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# DUTCH BOY RED-LEAD

# BALDWIN ACHIEVEMENTS BALDWIN IN 100 YEARS OF LOCOMOTIVE PROGRESS

**T**HIS year The Baldwin Locomotive Works passes the century milestone rounding out one hundred years of service both to railroads and to industry the world over. It is distinguished as the one locomotive-building establishment in the United States which has been in continuous operation for over a century.

One hundred years ago America was young. Transportation facilities were incredibly primitive—only a comparatively small amount of track had been built and the few locomotives in use could hardly be described as efficient and dependable. But progressive and far-seeing individuals visioned steam power as a basic need for national development and a powerful influence on American business and public welfare.

Matthias W. Baldwin of Philadelphia was the outstanding figure of this period of locomotive development. Mr. Baldwin, a successful builder of stationary steam engines, was one of the first to visualize the possibilities latent in the application of steam as motive power on railroads. At the request of his friend, Frank-

## One Hundred Years Ago Baldwin Built "Old Ironsides"

lin Peale, proprietor of the Philadelphia Museum, Mr. Baldwin built a miniature locomotive for exhibition purposes. On April 25th, 1831 this locomotive with two cars was placed in motion in the museum and immediately attracted crowds of admiring spectators.

Then and there Matthias W. Baldwin kindled the torch of locomotive progress and laid the foundation of the Baldwin Institution which today is the largest locomotive building company in the world with unsurpassed plant facilities, an emblem of stability, and an international influence.

The success of the model was so impressive that the Philadelphia, Germantown & Norristown Railroad Company late in 1831 placed an order with Mr. Baldwin for a locomotive to be used on its six-mile line between Philadelphia and Germantown.

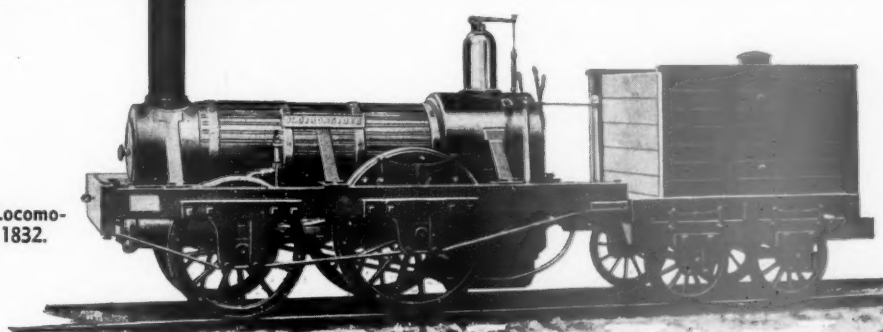
This was no simple task. Suitable tools and competent mechanics were scarce. Much of the work had to be done by hand and improvised tools. Diligently and with undaunted faith Mr. Baldwin surmounted these obstacles and completed the historic "Old Ironsides" in his small shop in Lodge Alley. On November 23rd, 1832, this locomotive was placed in service. All circumstances considered, "Old Ironsides" was regarded as a success and subsequently attained a speed of 30 miles per hour with its train.

So great had been the difficulties attending the construction of "Old Ironsides" and also in obtaining settlement for it that Mr. Baldwin remarked "That is our last locomotive!" But it was not—"Old Ironsides" was the



The Small Shop in Lodge Alley Where the First Baldwin Locomotives Were Built.

Historic "Old Ironsides," the First Baldwin Locomotive, Placed in Service on November 23rd, 1832.





# BALDWIN ACHIEVEMENTS BALDWIN IN 100 YEARS OF LOCOMOTIVE PROGRESS

first of 62,000 locomotives which have been built by The Baldwin Locomotive Works up to the present time.

Locomotive building, however, had become too fascinating and the romance of railroading too great for Mr. Baldwin. When an order for a locomotive was received from Mr. E. L. Miller of Charleston, S. C. in behalf of the Charleston & Hamburg Railroad Company he agreed to build it. This locomotive, named the "E. L. Miller," was completed on February 18th, 1834. Its design embodied the four wheeled leading truck, a single pair of driving wheels and various improvements which were original with Mr. Baldwin. The "E. L. Miller" performed so admirably on the rough and crooked tracks that locomotives of this type were built until 1842.

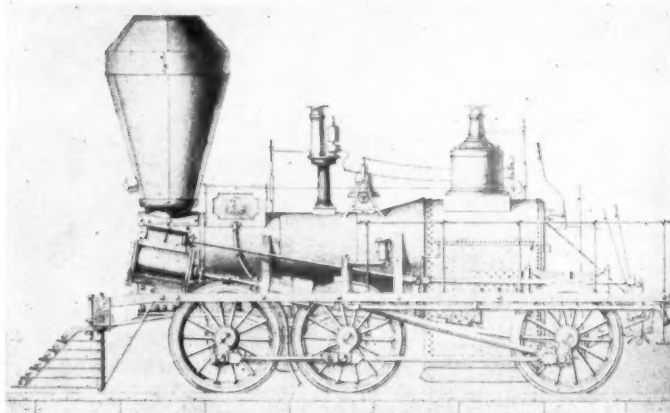
Steam motive power proved a great stimulant to industrial progress, resulting in a big demand for more powerful locomotives. Mr. Baldwin's small Lodge Alley shop became inadequate and a new shop was accordingly erected at Broad and Hamilton streets—the site, in part, of the great Philadelphia plant which continued in operation until 1928.

This development marked another stepping stone to greater achievements in locomotive building and symbolized the Baldwin spirit to serve the railroads efficiently and to keep pace with their progress.

The increased facilities enabled Mr. Baldwin to turn out 40 locomotives in 1836 and an equal number in 1837. Then came a serious financial panic and with it the first test of Baldwin stability. This crisis which brought ruin to so many did not leave Mr. Baldwin un-

## Baldwin Expands And Starts New Plant In Philadelphia

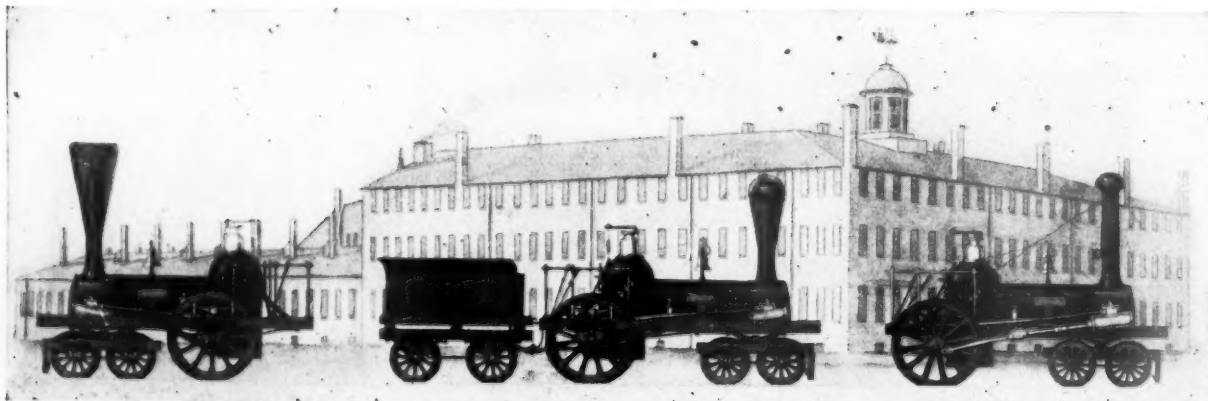
scathed. Mr. Baldwin, however, a man of sterling integrity and singular conscientiousness, courageously met the situation, and after a heroic struggle and personal self-denial was enabled to pay all his obligations in full and retain complete control of his business.



Baldwin Six-coupled Flexible Beam Truck Locomotive  
for Heavy Freight Service, 1842

After the financial storm had cleared, railroad business reached far greater proportions and demanded bigger locomotives. Accordingly, in 1842 Mr. Baldwin introduced his "flexible beam truck" to meet this demand for locomotives of greater hauling capacity.

This important development enabled him to build locomotives with either three or four pairs of coupled wheels carrying all the weight on the drivers and having an exceedingly flexible wheel base. These locomotives were remarkably successful and met the requirements of heavy freight traffic more efficiently than any other locomotives of this period.



Typical Baldwin  
Locomotives of  
the Period 1834-  
1842 with the  
Baldwin Shop at  
Broad and Hamil-  
ton Streets



# BALDWIN ACHIEVEMENTS BALDWIN IN 100 YEARS OF LOCOMOTIVE PROGRESS

The adoption of the flexible beam truck opened the way at once to the heavier and more powerful locomotives. The six-wheeled locomotives of this type weighed from 12 to 17 tons, and the eight-wheeled from 18 to 27

tons. In 1845, Mr. Baldwin first built the "American," or 4-4-0 type, and these engines weighed from 12 to 19 tons.

## Six and Eight Coupled Flexible Beam Truck Locomotives For Heavier Traffic

wheels, horizontal cylinders, bar frames, and link motion valve gear. The demand for transportation by the general government and the industries stimulated by the war taxed the carrying capacity of the Northern railroads to the fullest extent. The production during the war period reached a maximum of 130 locomotives in 1864.

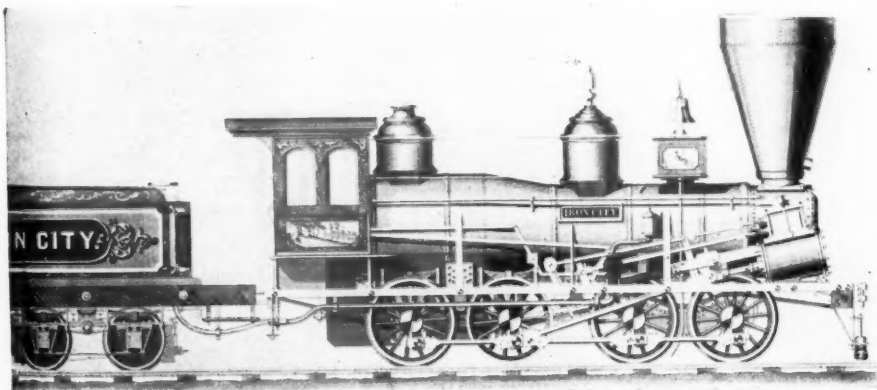
The introduction of steel in locomotive construction was a distinguishing feature of this period. The use of steel tires and steel fireboxes soon became general. Another feature was the placing of the cylinders horizontally.

One of the most notable locomotives built immediately after the Civil War was a heavy freight engine for the Lehigh Valley Railroad designed to operate on a grade of 133 feet per mile. This locomotive, the first of the 2-8-0 class with separate tender, was named "Consolidation." The name was subsequently applied to the type, and "Consolidation" engines have since been constructed for a large number of railroads in the United States and many foreign countries.

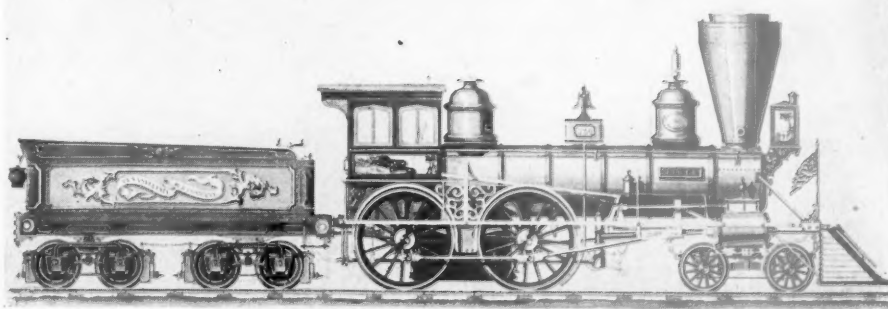
A notable Baldwin locomotive of this period was the "Governor Paine," a passenger locomotive for the Vermont Central Railroad designed to pull a train at the astonishing speed of 60 miles per hour. During its career, it was said to have covered a mile in 43 seconds.

In 1849, three high-speed locomotives similar to the "Governor Paine" were built for the Pennsylvania Railroad Company and a few years later, twelve freight locomotives, each weighing 56,000 lb., were also built for the same railroad.

The early-fifty period was marked by a most important step in the progress of American locomotive practice. The link motion was introduced, and soon proved its superiority over the various types of complicated gears formerly used. Mr. Baldwin, who was naturally conservative in adopting new devices, maintained that his variable cut-



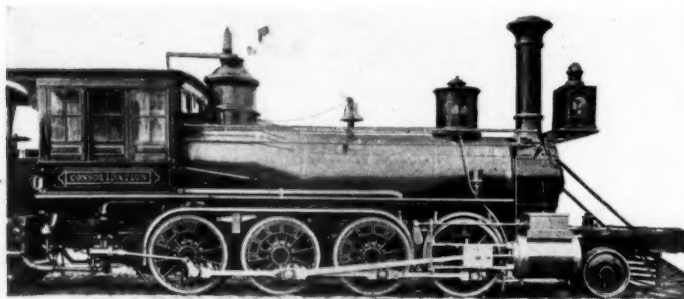
A Baldwin Eight-coupled Flexible Beam Truck Locomotive with Variable Cut-off, 1854



The "Tiger," a Baldwin Passenger Locomotive with Link Motion Valve Gear Built for the Pennsylvania Railroad in 1856  
Cylinders 15 in. x 24 in. Drivers, diam. 66 in. Weight, total engine 59,100 lb

# BALDWIN ACHIEVEMENTS BALDWIN IN 100 YEARS OF LOCOMOTIVE PROGRESS

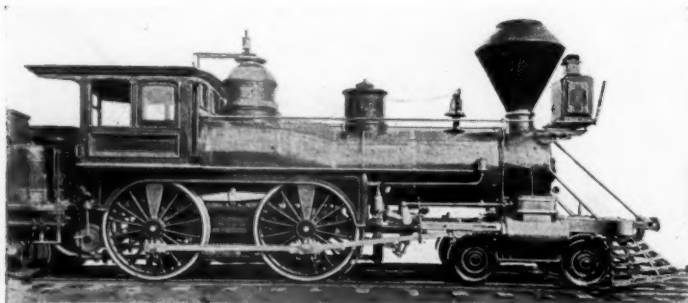
ON September 7th, 1866, Mr. Baldwin died. As a mark of respect a pause is therefore fitting, during this celebration of the Baldwin Centennial, to pay tribute to his memory. Mr. Baldwin had made many notable and permanent contributions to the art of locomotive building and the most appropriate monument is the Works which immortalize the name of Baldwin.



The "Consolidation," 2-8-0 Type for Freight Service  
Built for the Lehigh Valley Railroad, 1866  
Cylinders, 20 in. x 24 in. Drivers, diam. 48 in.  
Weight, total engine 90,000 lb.

Subsequent to Mr. Baldwin's death, the torch of locomotive achievement was passed to his associates who carried on as a copartnership, continuing the policies of the founder, and increasing the prestige of what has been for years the world's largest locomotive plant.

It was the members of this copartnership who successfully guided the concern through the difficult period which followed the panic of 1873, and who in the early eighties launched a vigorous policy of expansion. The business was conducted as a copartnership for 78 years during which period 33,500 locomotives were built, and the plant was enlarged to a capacity



The Locomotive That Made 153,280 Miles Before Shopping  
Built for the Pennsylvania Railroad, 1867  
Cylinders 17 in. x 24 in. Drivers, diam. 66 in.

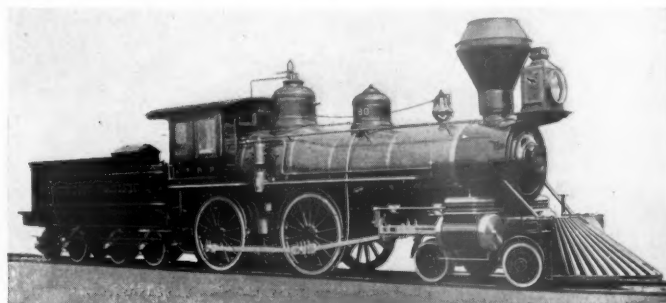
## Baldwin Locomotive In Constant Service For 153,280 Miles Without Repairs

of 2,500 locomotives per annum. This development was of a magnitude which, under private initiative, probably has had few equals in the industrial world.

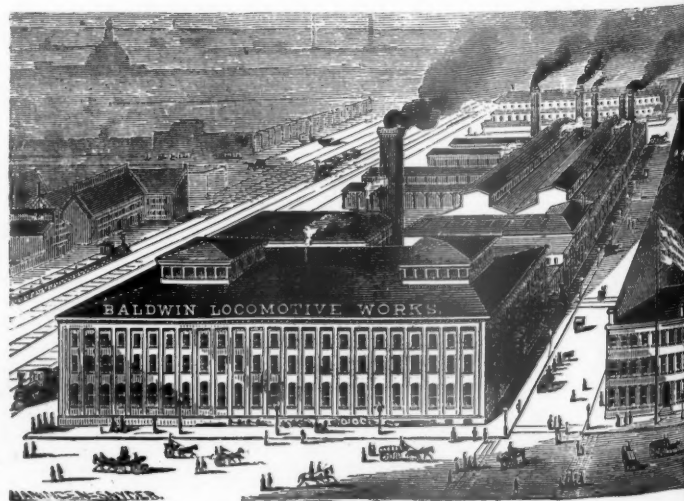
The reliable, trouble-free and low cost operation of Baldwin power was very

evident during the early periods. An excellent example was one of the eight-wheeled four-coupled engines built for the Pennsylvania in 1867 which remained in constant service from September 9, 1867 until May 14, 1871 having made a total mileage of 153,280 miles without being taken off its wheels for general repairs.

The Consolidation type was followed by the Decapod, the Atlantic, the Mikado and others, many of Baldwin origin. The development of the various types characterizes the Baldwin spirit of progressiveness and demon-



American (4-4-0) Type Locomotive for Passenger Service  
Built for the Northern Pacific Railroad, 1883  
Cylinders 17 in. x 24 in. Drivers, diam. 62 in.  
Weight, total engine 83,800 lb.



The Baldwin Plant in 1872



# BALDWIN ACHIEVEMENTS BALDWIN IN 100 YEARS OF LOCOMOTIVE PROGRESS

strates a willingness to build new designs for the purpose of attaining improved locomotive operation.

To this end the works built a compound locomotive for the Baltimore and Ohio Railroad as early as 1889. The economy in fuel and water and the efficiency of this design led to its extensive use on many leading railroads.

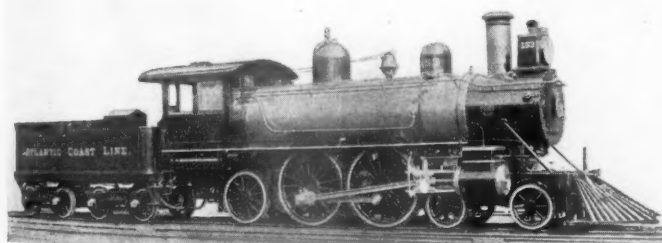
Baldwin's ability to build locomotives quickly as well as accurately was established in 1889 when a narrow gage locomotive of the American type was completed in eight working days.

While these developments were transpiring in steam locomotive design, the feasibility of electric motive power was receiving serious consideration. The first electric locomotive was constructed for experimental purposes in 1895 and the following year two others were

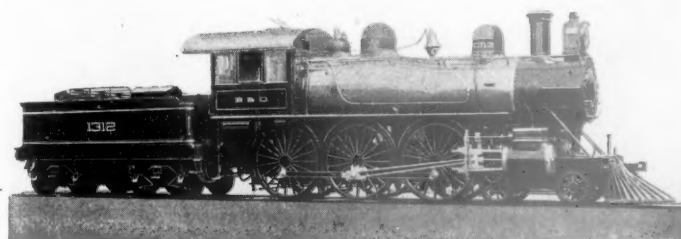
## Baldwin Builds First Consolidation Atlantic and Mikado Types of Locomotives

built in cooperation with the Westinghouse Electric and Manufacturing Company. Electrification offered the only solution to many important traffic problems and Baldwin - Westinghouse electric locomotives became increasingly prominent. Today they represent

one of the most important branches of the business. Typical units built during the 35-year Baldwin-Westinghouse affiliation are il-



Atlantic (4-4-2) Type Locomotive for Passenger Service  
Built for the Atlantic Coast Line, 1895  
Cylinders 19 in. x 24 in. Drivers, diam. 72 in.  
Weight, total engine 129,800 lb.

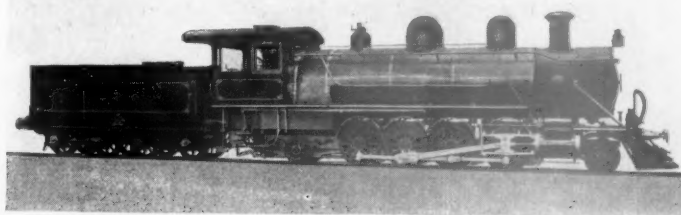


Ten-Wheeled (4-6-0) Type Locomotive for Passenger Service  
Built for the Baltimore & Ohio Railroad, 1896  
Cylinders 21 in. x 26 in. Drivers, diam. 78 in.  
Weight, total engine 145,000 lb.

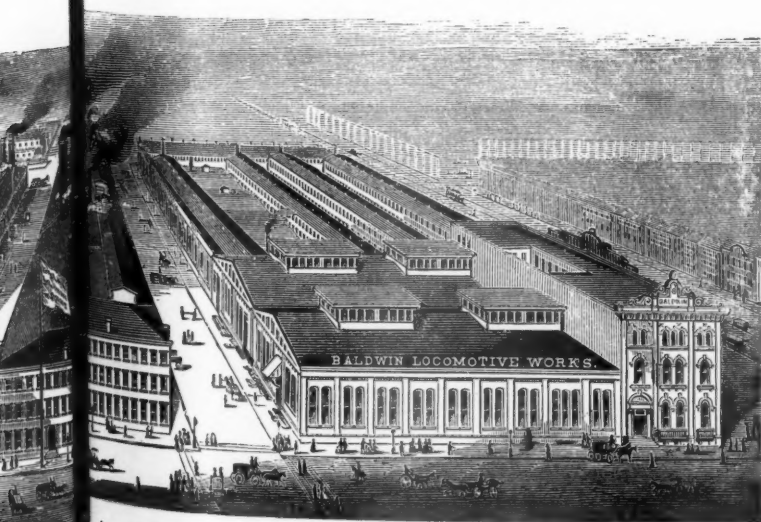
lustrated on pages 34 to 41 inclusive.

The beginning of the twentieth century witnessed larger demands for railway freight transportation. The introduction of cars having greater capacities involved increased train tonnage, improved road beds, heavier rails, stronger bridges and more powerful locomotives. This led to the development of the Prairie type, a large number of which were built for the Chicago, Burlington and Quincy Railroad, the Atchison, Topeka and Santa Fe Railway and other lines.

The rapidly increasing business made it evi-



The Pioneer Mikado (2-8-2) Type for Freight Service  
Built for the Nippon Railway (Japan), 1897  
Cylinders 18½ in. x 24 in. Drivers, diam. 44 in.  
Weight, total engine 119,600 lb.



Capacity of 400 Locomotives Per Year.



# BALDWIN ACHIEVEMENTS BALDWIN IN 100 YEARS OF LOCOMOTIVE PROGRESS

dent as early as 1906 that further expansion in the heart of Philadelphia was not practicable. A site was selected at Eddystone, Pennsylvania, on the bank of the Delaware River and 12 miles from Philadelphia. An immense erecting shop, especially designed for the construction of locomotives of the largest size, marked one of the earlier steps in the Eddystone development.

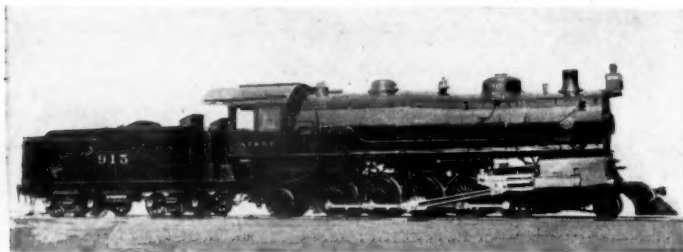
In 1909 an important change in organization was effected. The then existing partnership of Burnham, Williams & Company was dissolved, and a stock company under the name of Baldwin Locomotive Works was incorpor-

## Bigger Locomotives With Labor And Fuel Saving Devices

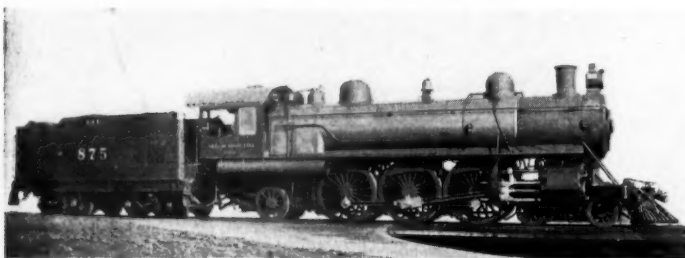
ated under the laws of the State of Pennsylvania. Two years later, the company was re-incorporated as The Baldwin Locomotive Works. Both reorganizations

were effected without drastic changes in personnel or management.

The successful introduction of the superheater, together with such fuel and labor sav-



**Santa Fe (2-10-2) Type Locomotive with Tandem Compound Cylinders**  
Built for the Atchison, Topeka & Santa Fe Railway, 1903  
Cylinders 19 in. and 32 in. x 32 in. Drivers, diam. 57 in.  
Weight, total engine 287,240 lb.



**Pacific (4-6-2) Type Locomotive for Heavy Passenger Service**  
Built for the Oregon Short Line, 1906  
Cylinders 22 in. x 28 in. Drivers, diam. 77 in.  
Weight, total engine 222,000 lb.



**Mallet Articulated Compound (2-6-6-2) Type Locomotive for Heavy Freight and Pusher Service**  
Built for the Great Northern Railway, 1906  
Cylinders 21 1/2 in. and 33 in. x 32 in. Drivers, diam. 55 in.  
Weight, total engine 253,000 lb.



The Philadelphia Plant in 1931

ing devices as feedwater heaters, mechanical stokers, coal pushers, power operated fire doors, grate shakers, and improved air brake equipment, was followed by locomotives of greater capacity and efficiency than those previously built. Large units of the Santa Fe, the Mallet Articulated, the Pacific, the Mountain and other types were placed in service.

Then came the World War in 1914. Baldwin officials immediately perceived the significance of the conflict and placed the facilities of the company at the disposal of the Allied Governments. New shops were erected at Eddystone for the manufacture of munitions. With the entrance of the United States into the war in 1917, the world wide demand for locomotives became enormous.

The large and efficient plant facilities with the ability to step up locomotive output quickly won for Baldwin the biggest and most

# BALDWIN ACHIEVEMENTS BALDWIN IN 100 YEARS OF LOCOMOTIVE PROGRESS

urgent orders for locomotives ever placed. A total of 5,551 locomotives were built for the War activities of the United States and the Allied Nations. Contracts executed by Baldwin and its associate companies totaled approximately \$250,000,000.

After the war, the capacity of the manufacturing facilities of The Baldwin Locomotive Works was far in excess of the locomotive re-

## The Completion Of The Baldwin Plant At Eddystone

growth of rail transportation would continue to demand greater facilities than the world had ever known.

Baldwin, now one hundred years old, stands on

the threshold of new achievements. The old spirit of loyalty and integrity grounded in the traditions of progress and dependable service is ever renewed. New blood and new enthusiasm carry forth the torch of achievement and pledge themselves to the advancement of railway transportation the world over.

Today Baldwin, with one hundred years of cumulative experience and unsurpassed plant facilities, stands prepared to build any type of motive power, either to Baldwin designs or to specifications furnished by the purchaser.

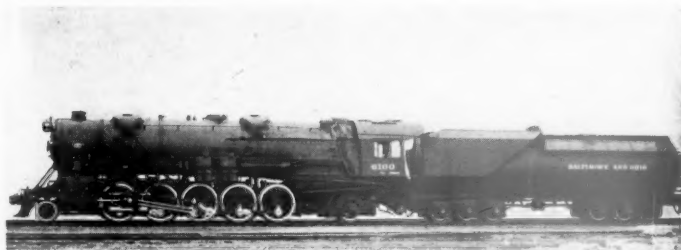


Plant in Eddystone, Pa., a landmark in the industrial world

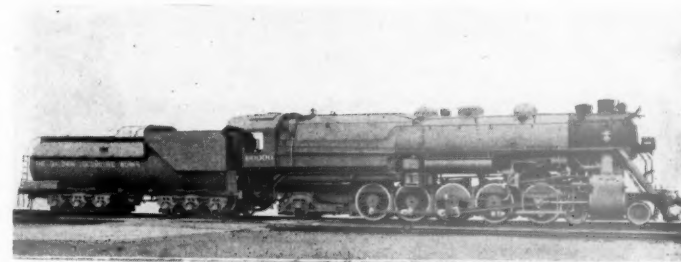
quirements of the United States. To utilize these facilities more fully, The Baldwin Locomotive Works inaugurated a vigorous foreign sales policy, and also acted as agents for the sale of various engineering products not necessarily related to locomotive building.

The year 1928 marked an event of vital importance in the history of Baldwin. The task of erecting new shops and transferring the Works from Philadelphia to Eddystone, was completed. The official closing of the old plant marked the passing of what had long been a landmark in the industrial world. It was the beginning of a more formal ceremony which commemorated on June 28th, 1928, the opening of the new plant at Eddystone.

The exercises held on that eventful occasion symbolized far more than the mere inauguration of a vast locomotive building institution. They signified an outstanding faith in the future of the nation, and a firm belief that the



**2-10-2 Type Locomotive for Freight Service**  
Built for the Baltimore & Ohio Railroad, 1923  
Cylinders 30 in. x 32 in. Drivers, diam. 64 in.  
Weight, total engine 436,500 lb.



**Baldwin Three-Cylinder 4-10-2 Type Locomotive with Water-Tube Firebox, 1926**  
Cylinder, inside, 1 high pressure 27 in. x 32 in.  
Cylinders, outside, 2 low pressure 27 in. x 32 in. Drivers, diam. 63 1/2 in.  
Weight, total engine 457,500 lb.



**Pacific (4-6-2) Type Locomotive for Passenger Service**  
Built for the Pennsylvania Railroad, 1927  
Cylinders 27 in. x 28 in. Drivers, diam. 80 in.  
Weight, total engine 316,510 lb.





# THE EDDYSTONE

WHERE BALDWIN



ELEMENTS

1931

LOCOMOTIVE PROGRESS

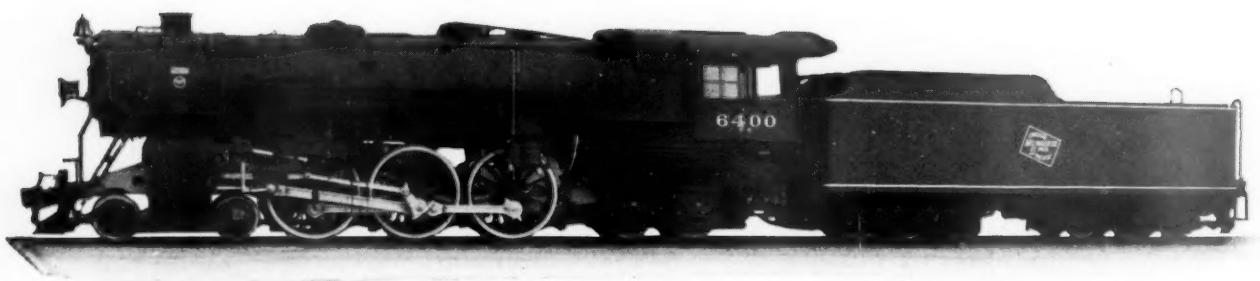


PLANT —

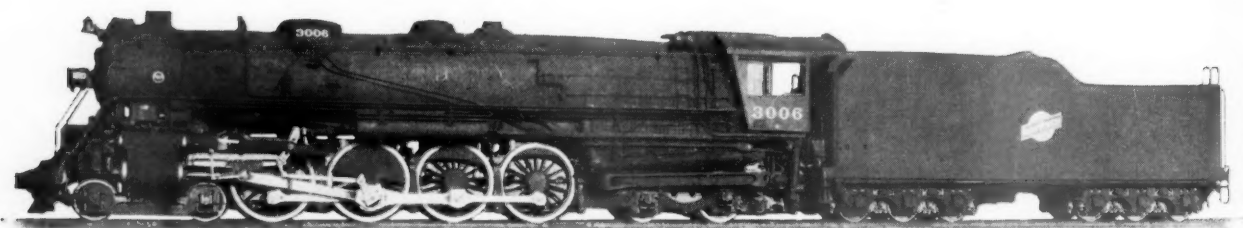
LOCOMOTIVES ARE NOW BUILT

**BALDWIN**  
**ACHIEVEMENTS**  
**BALDWIN**  
 IN 100 YEARS OF LOCOMOTIVE PROGRESS

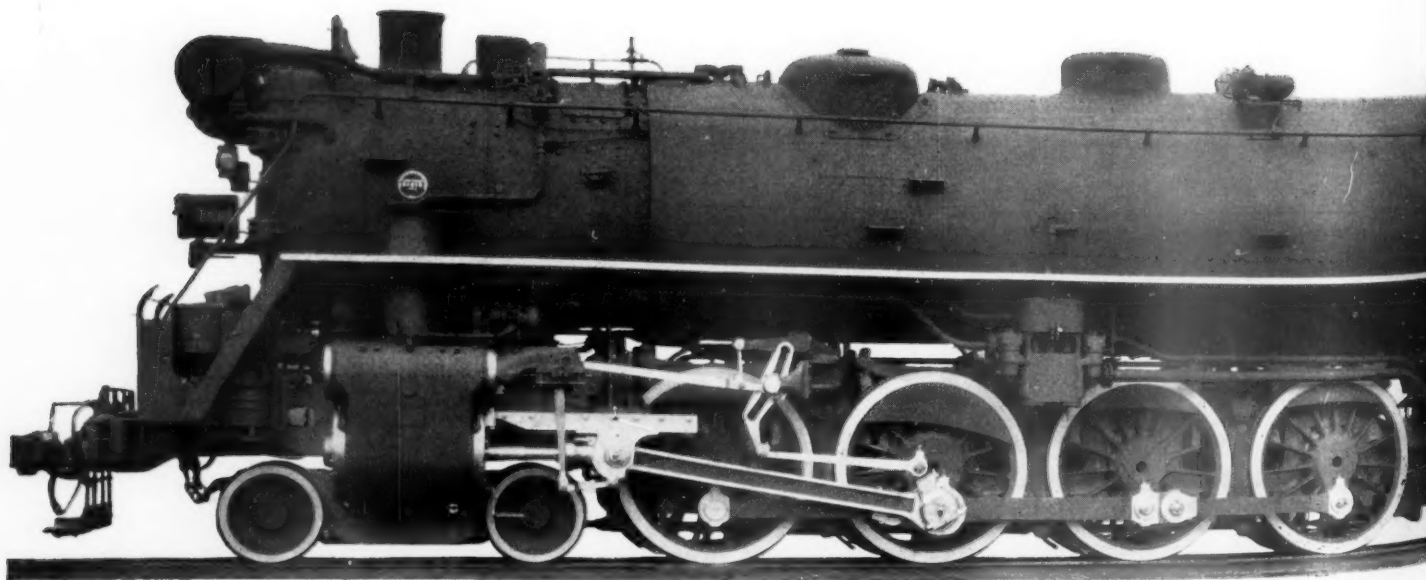
# Baldwin Modern Motive Power



**4-6-4 Type Locomotive for Passenger Service**  
 Built for the Chicago, Milwaukee, St. Paul & Pacific Railroad  
 Cylinders 26 in. x 28 in. Drivers, diam. 79 in. Weight, total engine 375,850 lb.



**4-8-4 Type Locomotive for Passenger and Freight Service**  
 Built for the Chicago & North Western Railway  
 Cylinders 27 in. x 32 in. Drivers, diam. 76 in. Weight, total engine 498,000 lb.



# BALDWIN ACHIEVEMENTS BALDWIN

IN 100 YEARS OF LOCOMOTIVE PROGRESS

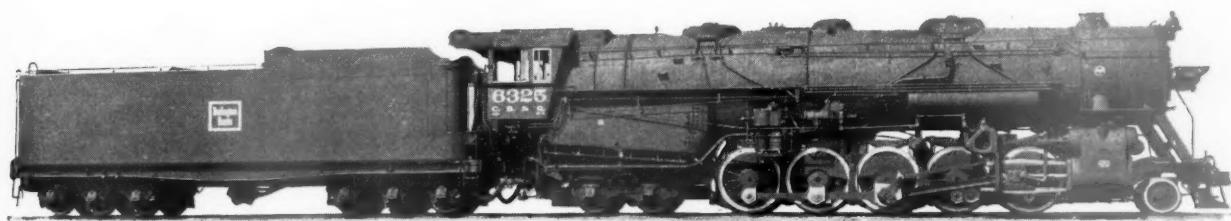
## Increases Net Operating Income

THE locomotives illustrated on these and the following four pages are typical of some of the modern classes of power built by The Baldwin Locomotive Works at its Eddystone Plant. Each represents a type or variation of a type designed and built to solve a specific problem—the high capacity locomotive for fast freight service—the powerful but flexible locomotive for heavy suburban ex-

press service—the high tractive force and large steaming capacity locomotive for fast speeds and long runs—the articulated locomotive for heavy grade and pusher service—the powerful switcher for handling main line trains—and the locomotives with larger capacity tenders for long continuous runs.

hour with minimum maintenance and have proved to be profitable investments which return big dividends in the form of reduced operating costs and increased net operating income.

The extent to which high capacity locomotives improve operating efficiency is indicated by the 15.8 per cent increase in the average freight train load of Class I railroads of the



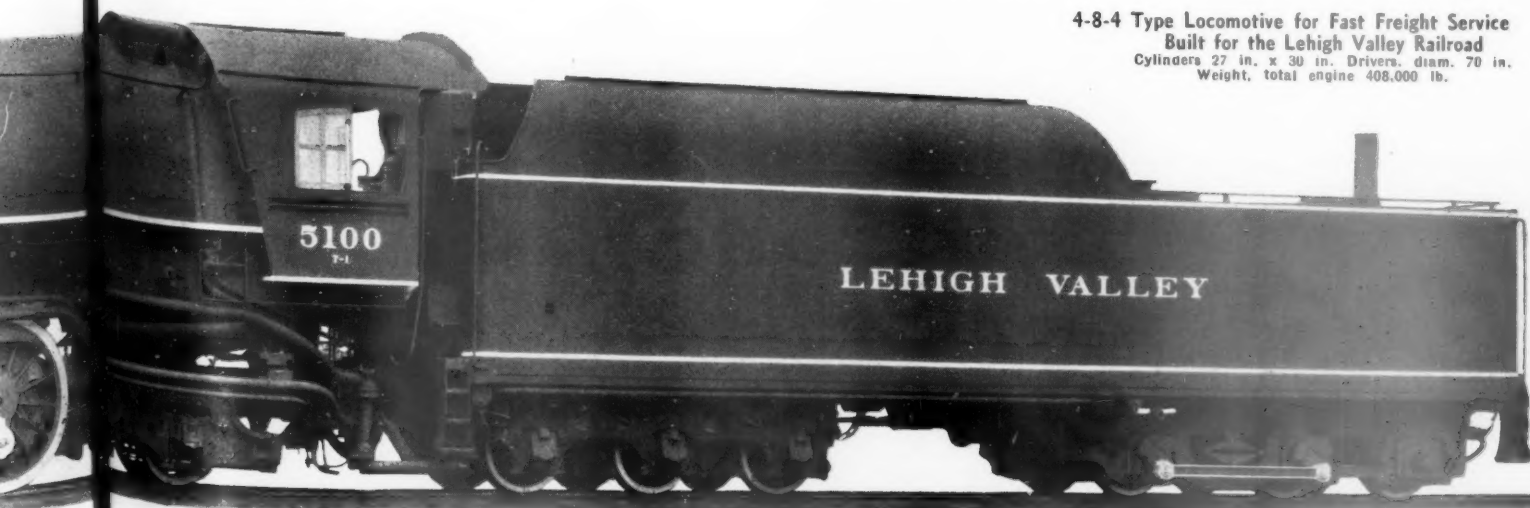
2-10-4 Type Locomotive for Freight Service  
Built for the Chicago, Burlington & Quincy Railroad  
Cylinders 31 in. x 32 in. Drivers, diam. 64 in. Weight, total engine 511,710 lb.

These powerful locomotives operating at maximum efficiency deliver more ton-miles per

United States from 1920 to 1925 during which period only 14 per cent of all freight locomotives were purchased new, an average of less than three per cent a year.

The further increase in boiler capacity and tender capacity and the improvements in combustion efficiency effected from 1925 to 1929 enabled locomotives to increase the average train load by another 11.4 per cent, during

4-8-4 Type Locomotive for Fast Freight Service  
Built for the Lehigh Valley Railroad  
Cylinders 27 in. x 30 in. Drivers, diam. 70 in.  
Weight, total engine 408,000 lb.





# IN 100 YEARS OF LOCOMOTIVE PROGRESS

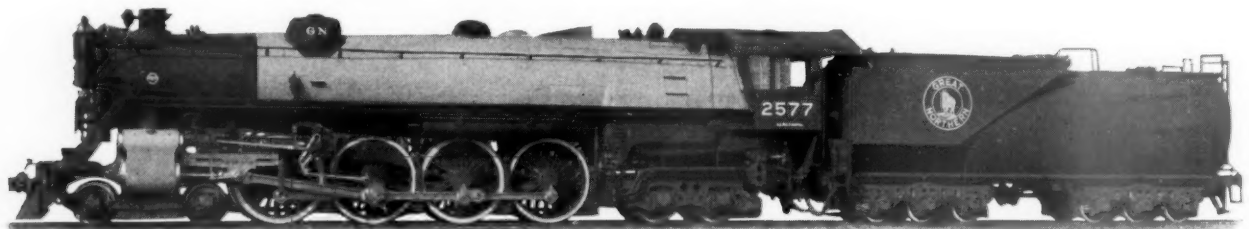
## Modern Motive Power Reduces

which period about 9 per cent of the freight locomotives in service were new, less than 2 per cent per year.

Modern locomotives have demonstrated substantial economies in fuel consumption, and under intensive utilization may be expected to show a net return on capital investment of 10 to 20 per cent, contributed largely from the savings in fuel, repairs, and crew wages.

lays at terminals but have also permitted a greater utilization of the locomotives. This has resulted in faster movement and increased tonnage per train, and has effected a steady increase during the past seven years of 58 per cent in the gross ton miles per train hour.

Only one half of the number of locomotives are required to protect the service by doubling the length of engine runs. The engines are



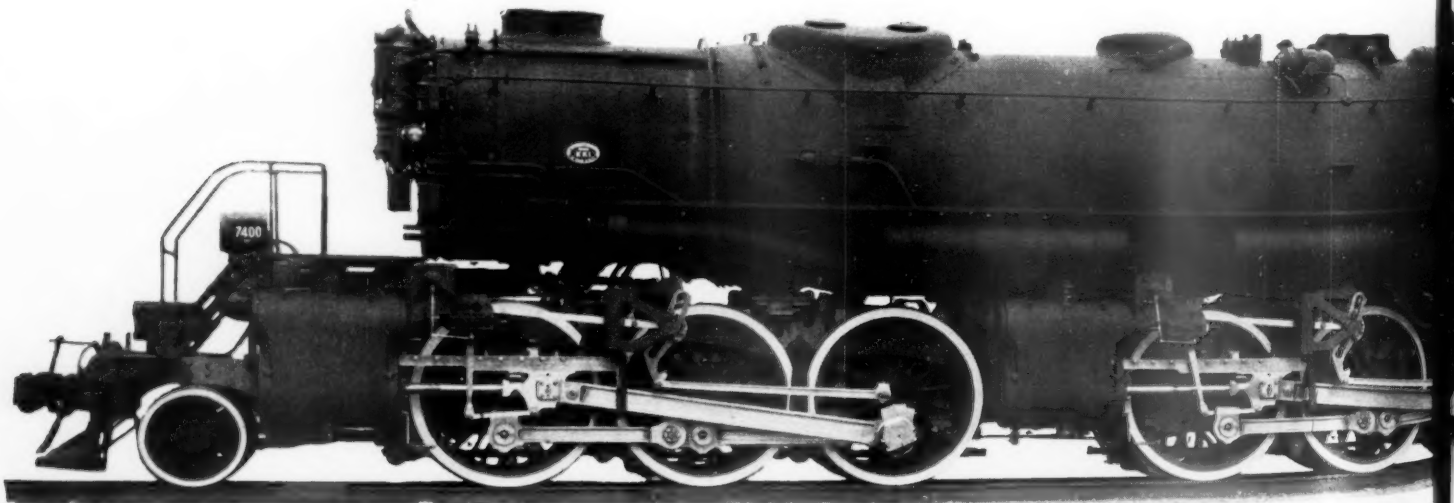
4-8-4 Type Locomotive for Passenger Service on Level Divisions  
 Built for the Great Northern Railway  
 Cylinders 29 in. x 29 in. Drivers, diam. 80 in. Weight, total engine 420,900 lb.

An outstanding example of profitable operation of the larger and more modern power is shown on one of the railroads. This road, by doubling the average length of engine runs, has reduced the total cost of operation per locomotive mile as much as 30 per cent in some instances, with an average of 10 per cent in both passenger and freight service.

These long runs have not only reduced de-

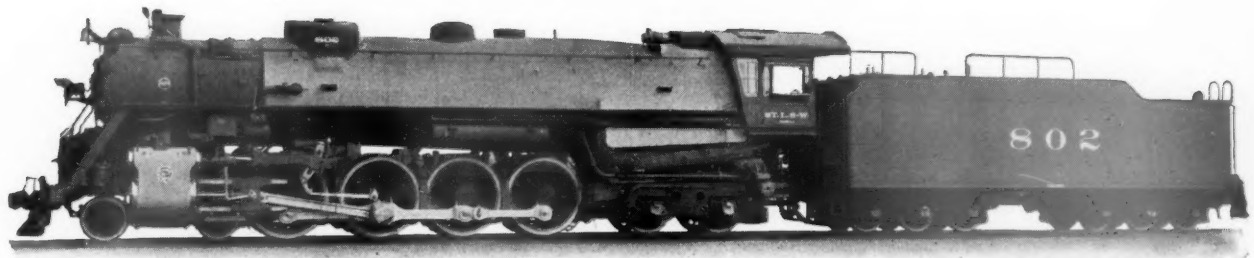
turned more frequently and they make their mileage in less time.

Improved transportation and greater net operating income today are not a question of more locomotives with which to increase gross revenue—but of fewer and more efficient locomotives to haul a relatively fixed volume of traffic more quickly and at less cost.

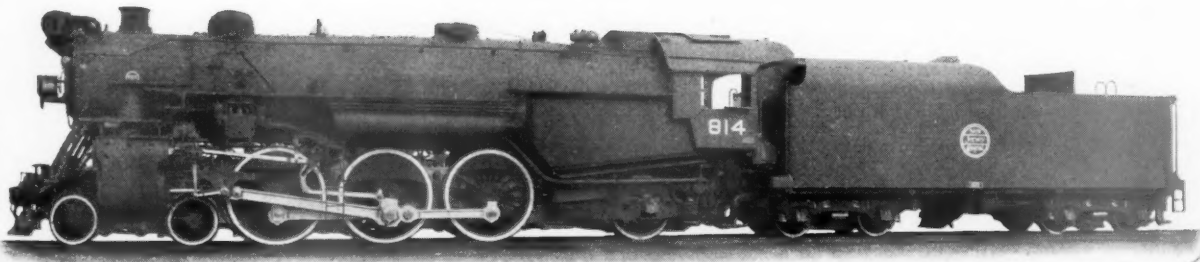


DAEDWIN  
ACHIEVEMENTS  
1831 1931  
DAEDWIN  
IN 100 YEARS OF LOCOMOTIVE PROGRESS

## Fuel and Maintenance Expense

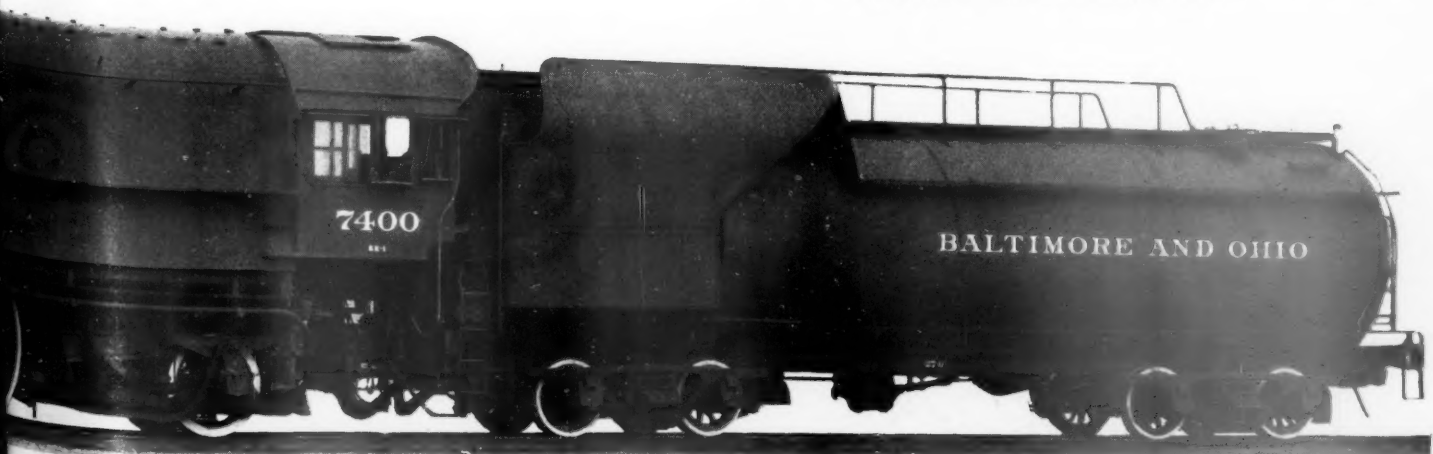


4-8-4 Type Locomotive for Fast Freight Service  
Built for the St. Louis Southwestern Railway  
Cylinders 26 in. x 30 in. Drivers, diam. 70 in. Weight, total engine 422,500 lb.



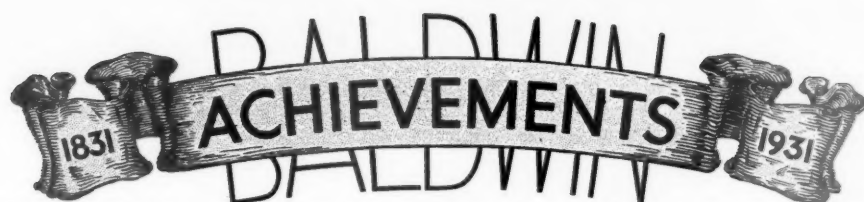
**Pacific (4-6-2) Type Locomotive for Heavy Express and Suburban Service**  
**Built for the Central Railroad of New Jersey**  
 Cylinders 26 in. x 28 in. Drivers, diam. 74 in. Weight, total engine 333,830 lb.

**Single Expansion 2-6-6-2 Type Locomotive for Heavy Fast Freight Service  
Built for the Baltimore & Ohio Railroad.**  
Cylinders (4) 23 in. x 30 in. Drivers, diam. 70 in. Weight, total engine 465,000 lb.  
Fitted with Emerson Water-tube Firebox









IN 100 YEARS OF LOCOMOTIVE PROGRESS

# to Economical Railroad Operation

longer continuous runs, resulting in fewer roundhouses and water stations. Modern metallurgy provides specific improvements in boiler plate, forgings, tires, wheels and other parts which have added safety to transportation.

These increases in operating efficiency and reductions in locomotive maintenance have made obsolete many of the 5 to 15-year-old locomotives. Yet nearly 80 per cent of the locomotives now in service are more than 10 years old. It is a fact that if many of the locomotives comprising the 80 per cent were scrapped, and the amount spent annually for repairs and maintenance applied to the purchase of new equipment, there would result material savings in operating expense and marked improvements in service, namely—

**Improved train operation, including longer and heavier trains, faster speeds and greater safety.**

**Improved locomotive operation, including a more economical use of fuel, water and lubricants, and reduced roundhouse servicing.**

**Reduced costs of repairs and replacements.**

The money saved by the substantial reduction in costs soon returns the purchase price of the locomotives, and the marked improvements in train operation strengthen the position of the railroad to meet competition and the growing demands of the future.



Single Expansion 4-8-8-2 Type Locomotive for Freight and Passenger Service on Mountain Grades

Built for the Southern Pacific Lines

Cylinders (4) 24 in. x 32 in.  
Drivers, diam. 63½ in.  
Weight, total engine 639,500 lb.



Mountain (4-8-2) Type Locomotive for Fast Freight and Heavy Passenger Service Built for the Pennsylvania Railroad

Cylinders 27 in. x 30 in. Drivers, diam. 72 in.  
Weight, total engine 390,000 lb.

Single Expansion 2-8-8-4 Type Locomotive for Heavy Freight Service Built for the Northern Pacific Railway

Cylinders (4) 26 in. x 32 in. Drivers, diam. 63 in. Weight, total engine 723,400 lb.  
The Largest Steam Locomotive in the World



# BALDWIN ACHIEVEMENTS BALDWIN

## IN 100 YEARS OF LOCOMOTIVE PROGRESS

### Industrial Locomotives To Meet Every Service Requirement

**T**HE rapid development of American industry, which commenced soon after the Civil War, made it evident that the demand for steam locomotives would not be confined to railway companies alone.

The utility of steam transportation in connection with the promotion of extensive lumbering, mining and manufacturing projects was quickly recognized, and this resulted in the opening up of a new field for Baldwin locomotives.

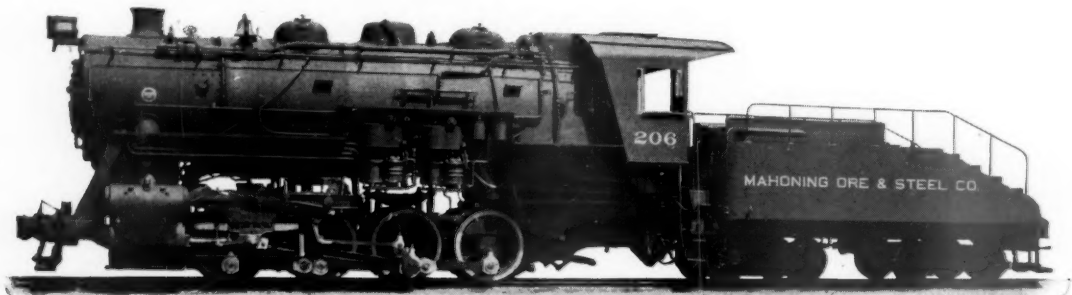
Orders began to arrive at the Philadelphia plant for a wide variety of engines to meet the needs of America's growing industries, as they spread from coast to coast over the entire continent. Practically all of this equipment had to be designed and built in accordance with special industrial requirements. In many respects these requirements involved numerous departures from contemporary steam railway practice, necessitating the development of most unusual types of locomotives.

Right from the beginning it was realized

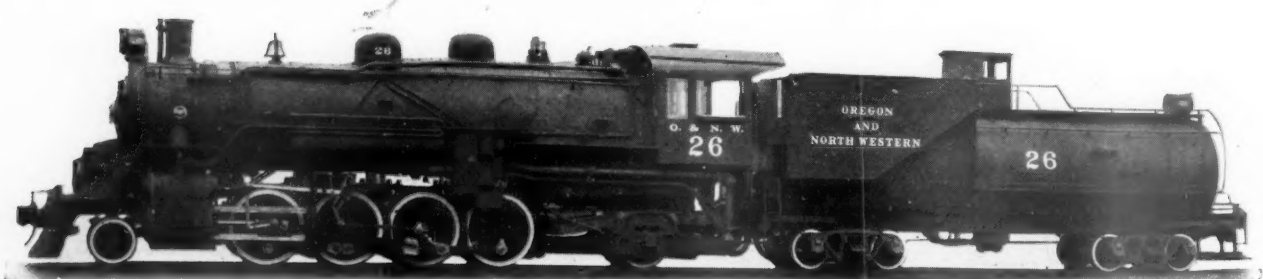
that many of these industrial locomotives, especially those intended for mining and lumbering districts, would have to operate under conditions and in locations where

the problem of maintenance would be one of supreme importance. These locomotives, therefore, had to be built with this problem always in view; parts had to be interchangeable and details made to standards or gages so that the ordering and assembling of repairs would be facilitated to the greatest possible extent.

As early as 1839 Mr. Baldwin felt the importance of making all like parts of similar engines absolutely uniform and interchangeable. Owing, however, to the many imperfections in machinery and tools available at that time, the production of interchangeable parts was not attempted until the year 1861, when a beginning was made by organizing the various locomotive manufacturing departments on this basis. From this beginning grew an elaborate and perfected system embracing all



**Eight-Coupled (0-8-0 Type) Locomotive for Heavy Switching Service**  
Built for Mahoning Ore & Steel Company  
Gage 4 ft. 8½ in. Cylinders 25 in. x 28 in. Drivers, diam. 51 in. Weight, total engine 258,400 lb.



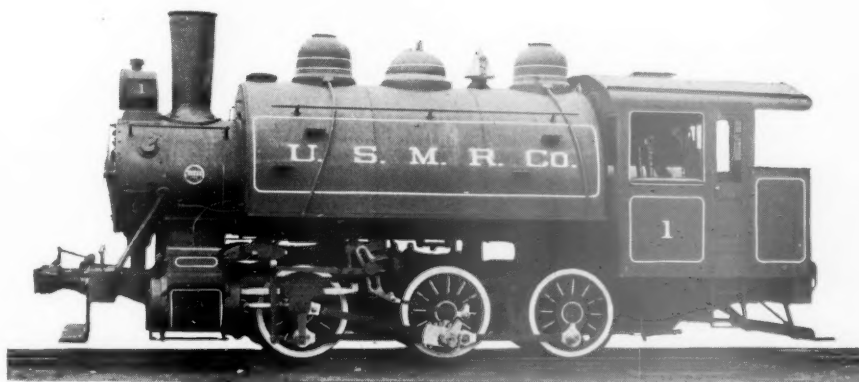
**Mikado (2-8-2) Type, Oil Burning Locomotive for Heavy Logging Service**  
Built for the Edward Hines Western Pine Company for operation on the Oregon and North Western Railroad  
Gage 4 ft. 8½ in. Cylinders 24 in. x 30 in. Drivers, diam. 57 in. Weight, total engine 280,560 lb.

# BALDWIN ACHIEVEMENTS BALDWIN IN 100 YEARS OF LOCOMOTIVE PROGRESS

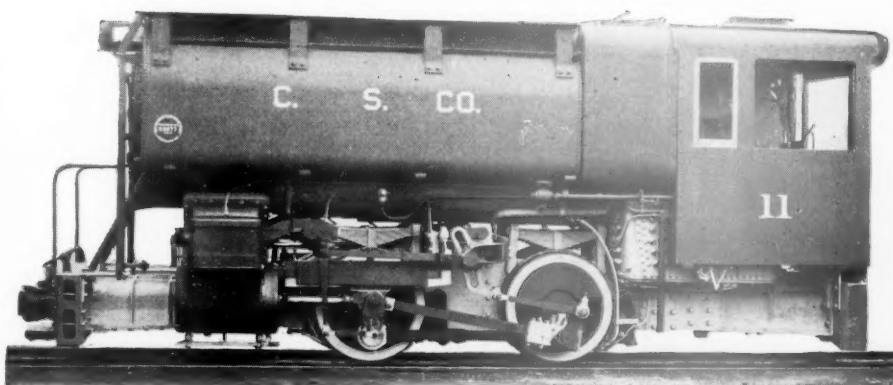
the essential details of locomotive construction. An independent department of the Works, having special tools adapted to the purpose, was organized as the Department of Standard Gages. A system of standard gages for every description of work to be done is made and kept by this department. The original templates are retained as "standards" from which exact duplicates are made and issued to the foremen of the various departments. Working gages are compared with the standards at frequent intervals, and absolute uniformity is thus maintained.

This system makes certain that every essential detail of each industrial locomotive manufactured by The Baldwin Locomotive Works can be duplicated with precision and exactness at any time. These locomotives are built to meet a wide range of curvature, grade, fuel and haulage requirements for every type of industry, regardless of location and operating conditions.

Baldwin's complete manufacturing and shipping facilities insure the highest constructional efficiency and prompt delivery to all parts of the world.



**Six-wheel (0-6-0) Saddle Tank Locomotive**  
Built for the United States Metals Refining Company  
Gage 4 ft. 8½ in. Cylinders 18 in. x 24 in. Drivers, diam. 44 in. Weight, total engine 121,130 lb.



**Four-wheel (0-4-0) Side Tank Locomotive for Switching Service**  
Built for the Carnegie Steel Company  
Gage 2 ft. 6 in. Cylinders 17 in. x 20 in. Drivers, diam. 40 in. Weight, total engine 101,800 lb.



**2-6-6-2 Type, Side Tank Locomotive for Logging Service**  
Built for the Weyerhaeuser Timber Company  
Gage 4 ft. 8½ in. Cylinders (4) 16 in. x 24 in. Drivers, diam. 44 in. Weight, total engine 263,250 lb.



# BALDWIN ACHIEVEMENTS BALDWIN IN 100 YEARS OF LOCOMOTIVE PROGRESS

**T**HE success of "Old Ironsides" created world wide interest, for all eyes were focused on Baldwin's locomotive developments and activities.

It was only a few years later, or in 1838, that the first Baldwin Locomotives for export were shipped to Cuba. In 1841 a shipment was made to Austria. Thus was inaugurated a most important branch of the business, for today Baldwin Locomotives are in operation on railways the world over.

Baldwin's service to foreign countries covers more than the mere building and shipping of locomotives. Baldwin Engineers consult and cooperate with the railway's representatives and engineers. They make a careful study of the profile maps showing the ruling grades. They study curvatures, clearances, bridges, tunnels, gages, weight limitations, traffic conditions and available fuels. They bring to bear on the foreign problem complete knowledge of the numerous economizing devices now available for reducing

## Baldwin Locomotives Have Been Shipped To Railways The World Over

the cost of locomotive operation.

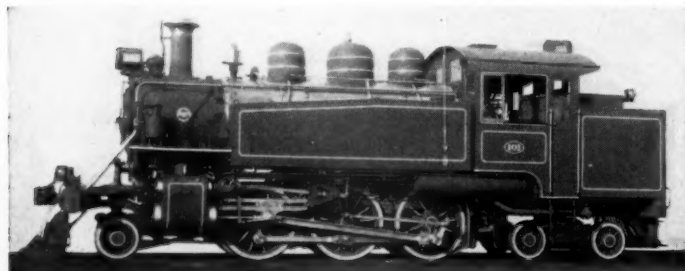
With this information, in addition to an intimate knowledge of world motive power needs, standards and systems of measurement, Baldwin Engineers are prepared to

design locomotives best suited to meet any specified conditions. On a number of occasions locomotives have been constructed throughout to the metric system.

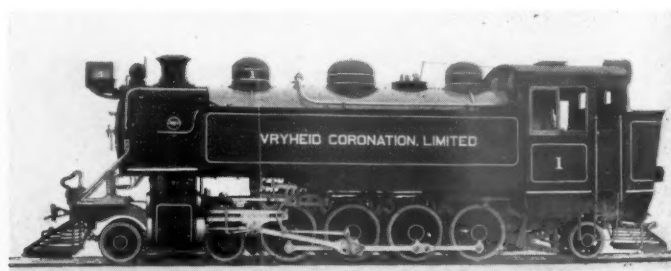
The stability of the Baldwin Organization and the reliability of its products assure a quick and dependable supply of repair parts which are accurate in every detail, thoroughly tested and qualified to stand up in service.

The locomotives illustrated on this and the next page are representative of the different types which are giving economical performance under widely varying conditions.

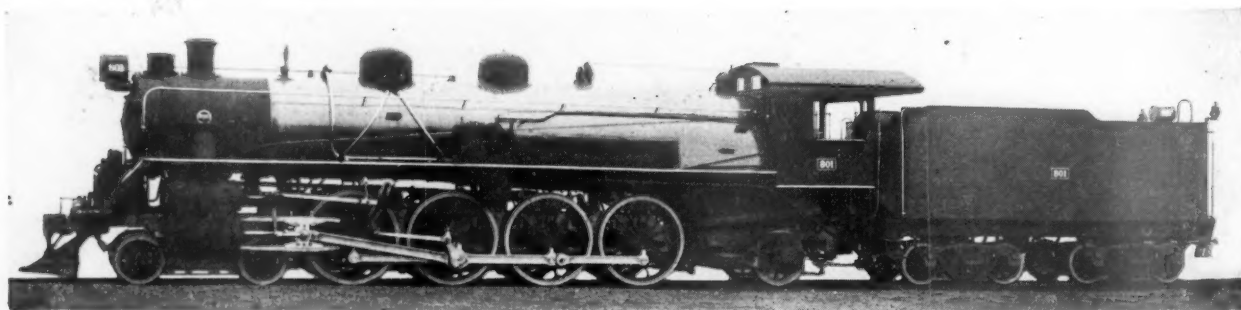
At present we are building five locomotives of the 2-10-2 type, comparable in capacity to the motive power used in the United States, for the Union of Soviet Socialist Republics.



**Tank Locomotive, 2-6-4 Type**  
Built for the Mukden Hailung Railway, China  
Gage 4 ft. 8½ in. Cylinders 18 in. x 24 in. Drivers, diam. 54 in.  
Weight, total engine 168,100 lb.



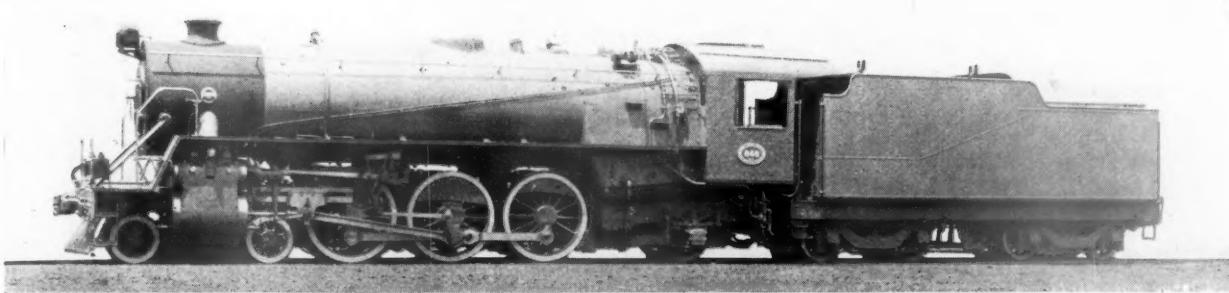
**Eight-Coupled 4-8-2 Type Side Tank Locomotive for Freight Service**  
Built for Vryheid Coronation, Ltd., South Africa  
Gage 3 ft. 6 in. Cylinders 18 in. x 22 in. Drivers, diam. 42 in.  
Weight, total engine 168,100 lb.



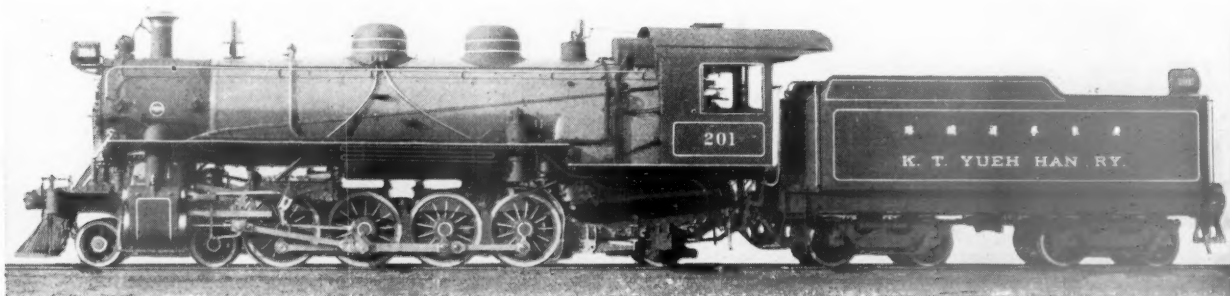
**Mountain (4-8-2) Type Locomotive for Passenger and Freight Service**  
Built for Chilean State Railways  
Gage 1,676 mm. Cylinders 559 mm. x 711 mm. Drivers, diam. 1 m. 676. Weight, total engine 105,410 kg.

# D A L D U M M ACHIEVEMENTS D A L D U M M

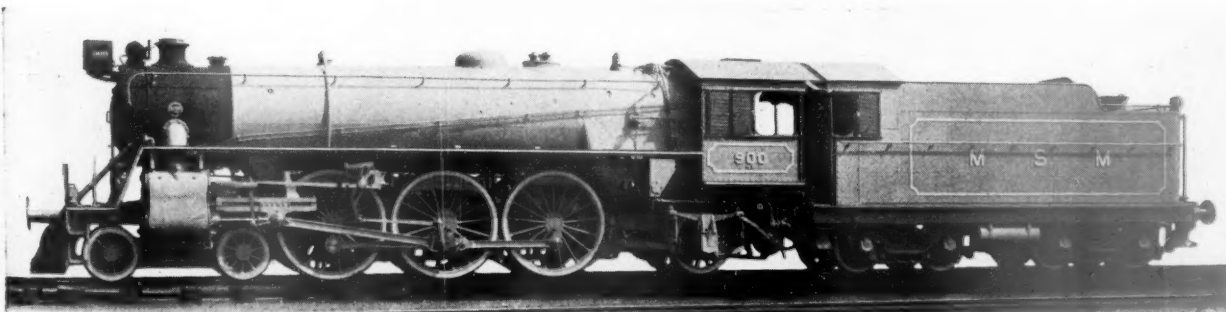
## IN 100 YEARS OF LOCOMOTIVE PROGRESS



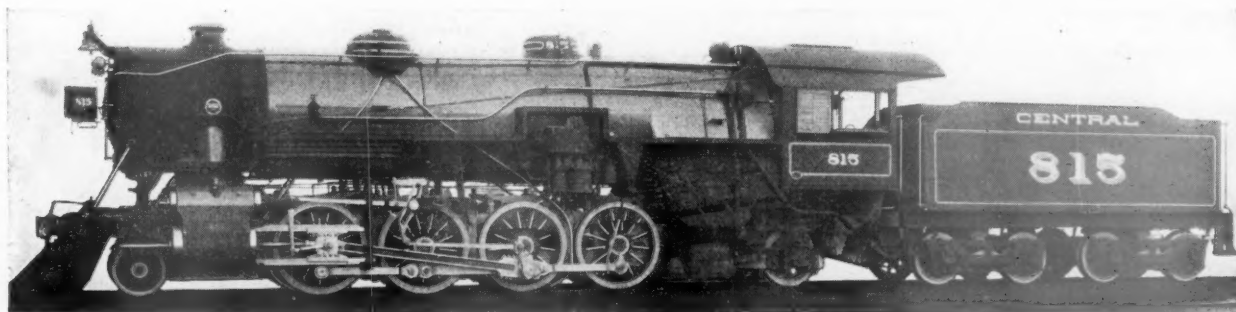
**Pacific (4-6-2) Type Locomotive for Passenger Service**  
**Built for the South African Railways and Harbours**  
 Gage 3 ft. 6 in. Cylinders 22 in. x 26 in. Drivers, diam. 60 in. Weight, total engine 199,900 lb.



**Mountain (4-8-2) Type, Three-Cylinder Locomotive**  
**Built for the Kwangtung Yueh Han Railway, China**  
 Gage 4 ft. 8½ in. Cylinders 17 in. x 24 in. Drivers, diam. 50 in. Weight, total engine 185,960 lb.



**Pacific (4-6-2) Type Locomotive for Passenger Service**  
**Built for Madras & Southern Mahratta Ry. Co., Ltd., India**  
 Gage 5 ft. 6 in. Cylinders 22 in. x 28 in. Drivers, diam. 74 in. Weight, total engine 184,600 lb.



**Mikado (2-8-2) Type Locomotive for Freight Service**  
**Built for the E. de F. Central do Brazil**  
 Gage 5 ft. 3 in. Cylinders 23 in. x 28 in. Drivers, diam. 57 in. Weight, total engine 239,200 lb.

# BALDWIN ACHIEVEMENTS BALDWIN IN 100 YEARS OF LOCOMOTIVE PROGRESS

**W**HEN it is realized that the total product of The Baldwin Locomotive Works to date is nearly 62,000 locomotives, those who are familiar with the complexities of modern locomotive construction, will be able to form some idea as to the immensity of this institution. It would be only natural for railroad men to attempt a visualization of Eddystone by making comparisons with some

## Baldwin Facilities At Eddystone Insure Speed and Precision In Locomotive Construction

administration building, a chemical laboratory, a physical laboratory, a shipping wharf and other associated properties. These facilities occupy 518 acres of land and are located on the shore of the Delaware river.

The shops mentioned above comprise what is virtually a coordinated group of large manufacturing establishments, each designed for the mass production of spe-



Pouring a Large Casting in One of the Four Foundry Units

of this country's large locomotive repair shops. In doing this, however, it should always be remembered that the Baldwin product is complete locomotives; and that these machines are fabricated (with the exception of certain specialties) from what is essentially raw material—cast, forged and machined—right at Eddystone.

The principal components of this plant are a foundry, a pattern shop, a smith shop, a boiler shop, a cylinder shop, frame shop, wheel shop, tank shop, machine shop and a main erecting shop; together with a general

cific locomotive details, either in a rough or finished form, with the main erecting shop as their common focal point to which the output of all producing units must finally come for assembly.

And, it is right here—in the erecting shop—where we find the dominating motif of this entire picture. The Baldwin erecting forms—they stand where the erection of locomotives begins and have exercised a most profound influence on every branch of locomotive construction. They have forced absolute accuracy in every line of machining; they demand



# BALDWIN ACHIEVEMENTS BALDWIN IN 100 YEARS OF LOCOMOTIVE PROGRESS

efficiency of organization in every shop which handles foundation material; they preach the gospel of accuracy and practice what they preach.

Standing rigid and four-square, they accept no incorrectly machined part. When the frames are clamped in place, they are as square and level as the forms. Unless the cylinders and cross-ties conform to the same unvarying accuracy, they cannot be applied. Once applied they are reamed and bolted while held in position. The whole locomotive foundation is not only as level and square as the forms but is also free from strains. Frames do not break in road service from erecting strains and driving boxes are always in line.

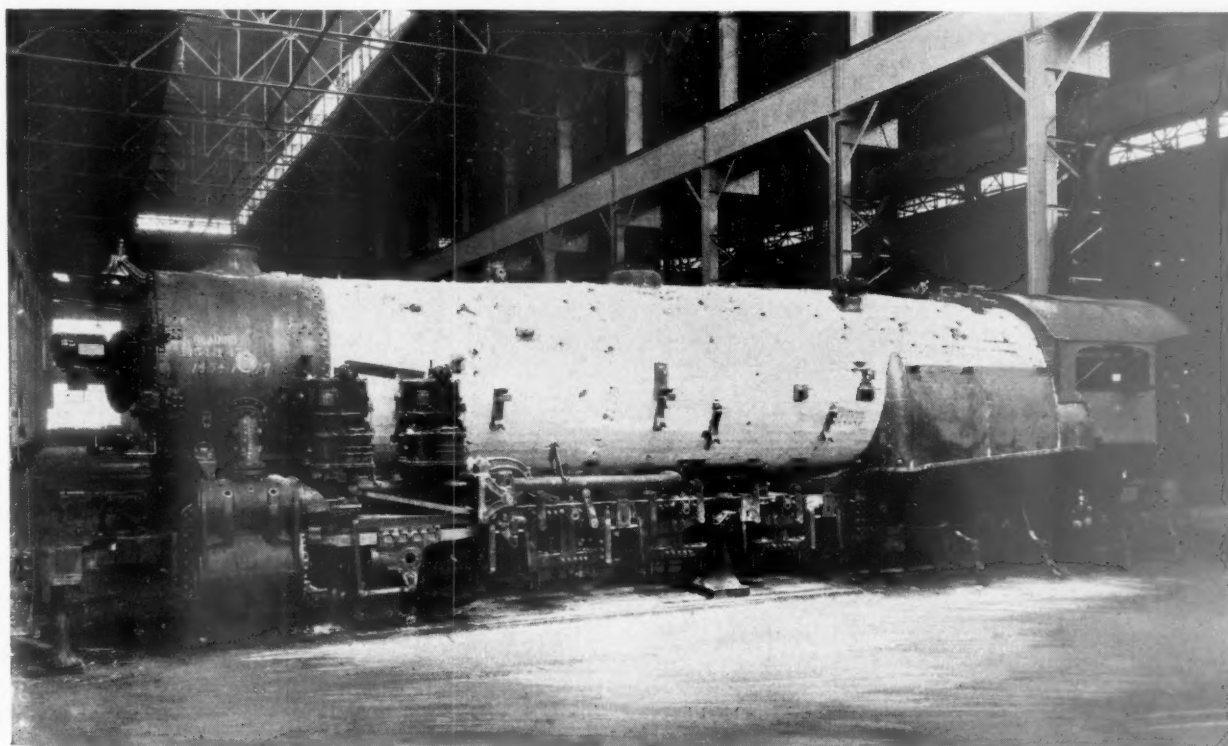
The example of orderly procedure set by the forms has been carried out in all sections of the plant and has resulted in the formation of an organization which meets the pace they set. The comfort and satisfaction of handling accurately machined parts has raised the standard of workmanship, and this standard has spread to all parts of the Baldwin Works. There are no half-way measures to these Baldwin erecting forms. Grim and unyielding they stand, barring the unfit and accepting only that which meets the most exacting demands.

In addition to the perfect workmanship and machining accuracy thus insured, Eddystone also provides unsurpassed laboratory facilities for the expert testing and inspection of all materials entering into Baldwin locomotives.

A technical personnel of thorough competence covers every phase of locomotive construction from sand for the foundry to the composition of steel for the boilers; from the billets in the smith shop to the paint and varnish which give a finishing touch to completed locomotives.

This department administers existing specifications and makes new ones as the need arises; it selects from a great variety of materials offered, those best suited to the purpose in view. Its inspectors visit every important manufacturing center and its chemists analyze products from all over the world. They delve deep into the realm of metallurgy in almost all of its many aspects, that materials may be found to meet the ever-growing demands of super-powered locomotives.

The story of The Baldwin Locomotive Works at Eddystone is truly one of achievement, of purpose and of faith in the broad principle that the best service that can be rendered, is the only service that is worth offering.



A Reading Locomotive on the Erecting Forms

# BALDWIN ACHIEVEMENTS BALDWIN

## IN 100 YEARS OF LOCOMOTIVE PROGRESS

**T**HE Eddystone Wharf, known as No. 251, with its powerful cranes and the 35-foot deep and 300-foot wide water channel to the Delaware main seaway, has a worth while significance to the railroads and industries of the world. These loading and water facilities give Baldwin the decided advantage of being able to ship completely assembled locomotives and thereby serve foreign countries more promptly and economically.

### Complete Locomotives Are Shipped To Foreign Countries From The Eddystone Plant

vised by experienced and competent inspectors.

Baldwin service is not confined to the shipment of complete locomotives. In many cases they are shipped in small units to foreign countries where the unloading facilities are limited or where parts

must be carried over mountain trails.

The wharf is equipped with 50- and 75-ton gantry cranes which run the entire length of the loading slip. When the vessel docks a



Completely Erected Locomotives Being Shipped from Wharf No. 251

The shipment of completely erected locomotives makes possible many tangible savings at the point of destination. The locomotives can be placed in service a few hours after unloading, with minimum delay. This eliminates the cost of dismantling the locomotives at the shop after they have been erected and tested, as well as the time and expense of boxing the parts and the cost of reassembling the locomotives.

Railroads and industrial companies receiving completely erected locomotives from the Baldwin Plant have full assurance that the assembly has been consummated in a modernly equipped shop with every mechanical convenience, and that all adjustments have been super-

stream of locomotives starts moving from the nearby shops. Steel cable slings are placed around the locomotives—powerful cranes pick them up and place them on the ship—all is accomplished in a minimum amount of time.

The wharf offers every convenience for servicing vessels. It is piped for water and oil so that vessels can fill their tanks without delay. Fire protection is provided by high pressure fire lines with outlets at strategic points.

The method of shipping complete locomotives has proved highly satisfactory. Over a thousand have been loaded since the wharf was opened, and the largest single sea shipment of engines ever made, sailed from Wharf 251.

## RAILWAY AGE

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# Shall Freight Rates Be Advanced?

In a period of depression the railways are considering asking for a general advance in freight rates. Business men and the public should carefully consider the reasons for this.

The paramount reason is that officers of life insurance companies, savings banks and other fiduciary and financial institutions, which own some five billion dollars of railroad securities, are emphasizing that these companies are being jeopardized by the failure of numerous railways to earn sufficient returns to maintain their bonds and other funded securities as legal investments. The law of New York state, for example, requires that 150 per cent of the interest upon bonds must be earned each year to make and maintain them as legal investments for insurance companies and savings banks, and many railways are not earning even 100 per cent of their interest.

Such institutions have such large investments in railway bonds partly because railways have a relatively greater amount of bonds outstanding than large industrial and commercial concerns, and partly because railway bonds have been regarded as among the safest investment securities available. The effect produced upon insurance companies and savings banks by failure of many railways to earn the interest upon bonds held by such institutions, would be a national calamity; and the effect produced by the dumping of the bonds upon the market because they had ceased to be legal investments would be hardly less serious.

The principal of railway bonds is frequently becoming due and payable, and large investment companies could not buy new railway bonds to replace those the principal of which became payable if the railways needing to do refunding were not earning the returns required to make their new bonds legal investments. Railroads that found themselves without a market for refunding bonds would have to go into receivership.

In 1930 the average return earned by the railways was only 3.36 per cent upon their property investment. In the first quarter of 1931 it was only two per cent. The latter figure is less than the amount required to pay the fixed charges of the railways as a whole, and means that, while some railways are earning their interest charges, many others are not.

What to do, when confronted with such a situation, presents a thorny problem to railway executives. They have the responsibility of initiating such measures as

may be necessary to remedy the situation, but not the power to adopt some of these measures because of the government regulation to which the railways are subject. Government policies as well as the depression have created the present railway situation, and without the assistance of government authorities railway executives cannot solve the problem it presents unless there is soon a revival of business and a consequent increase of railway traffic and earnings.

### The Question of Wages

In 1921, when the last previous depression prevailed, the railways sought and secured reductions of wages, which had been largely advanced under government operation and also by an award of the Railroad Labor Board in 1920. The reduction of wages was accompanied by a general reduction of freight rates by the Interstate Commerce Commission, which in 1920 had authorized a large general advance in rates. It is natural that suggestions should come from various sources that in the present emergency also railway wages should be reduced. In the fall of 1929, however, railway executives and labor leaders, along with other business and labor leaders, were called together by President Hoover, and agreed not to seek reductions or advances of wages. Widespread reductions of wages have since been made, but it has continued to be the policy of the national administration, as repeatedly expressed by President Hoover and other spokesmen of the administration to try to maintain wages. The railroad industry is subject to regulation by the national government, and naturally railway executives hesitate to disregard a wage policy repeatedly announced by the administration until they have tried every other available means of solving the problem with which they are confronted.

Furthermore, railway wages are subject to regulation by the federal Railway Labor act. This act provides, when changes in wages or working conditions are contemplated, first, for conferences between the railways and their employees; second, if differences arise, for mediation by the Federal Mediation and Conciliation Board; third, if mediation fails, for arbitration; fourth, if no agreement to arbitrate can be secured, for hearings and a report by a board appointed by the president of the United States. Labor leaders never have agreed to arbitrate a proposed reduction of



railway wages, and could hardly be expected to do so now when the certain result of their refusal to arbitrate would be the reference of the matter to a board appointed by President Hoover, who favors maintenance of wages as a means of stabilizing business and restoring prosperity.

Railway executives know that all industry and commerce are suffering from the depression. They know that the railways are subject to more competition from other agencies of transportation than ever before, and that owing to this competition it would be more difficult than ever before to make a general advance of rates an effective means of securing increased revenues. At the same time, many railway executives feel that they would be unfaithful to the public, and especially to investors in railroad bonds, if they made no effort to secure a greatly needed increase in railway net operating income through an advance in rates.

Doubtless the railway situation would be serious if the roads were suffering only from the depression; but this is not the case. The reduction of freight rates made by the Interstate Commerce Commission in 1922, and numerous subsequent reductions, have amounted, based on the traffic of 1929, to 900 million dollars annually, and meantime the average wage has been increased until it is 5 per cent higher than in 1921. Many of these reductions of rates have been unwarranted; and it has been largely due to them that the railways in years of good general business have failed to earn a fair return and recently as a whole have not been earning their fixed charges. In addition, the state and national governments, by subsidizing and failing adequately to regulate other agencies of transportation have helped to divert from the railways much traffic which they now sorely need.

#### Responsibility of Railway Managers and Public

The railways are not considering asking an advance in rates sufficient to enable them, in a period of depression, to earn the "fair return" of  $5\frac{3}{4}$  per cent to which the Interstate Commerce Commission has held them entitled, but has never let them earn. They know that to seek a "fair return" under such conditions as now exist would be futile. All they are considering asking for is an advance in rates sufficient to enable them to maintain their properties in safe operating condition and to avoid the destruction of their bonds as investment securities, and the losses which this would cause to the policy holders and depositors of the insurance companies and savings banks which own so large a part of their bonds.

It is the responsibility and duty of railway executives to adopt and propose all the measures that they believe necessary to remove the menace to the public welfare which the existing railway situation presents. They already have made reductions of operating expenses at the rate of 700 million dollars a year as compared with those of 1930, and at the rate of more than one billion dollars a year as compared with those of 1929. For the further safeguarding of investors in railway securi-

ties, and of railroad service, credit and solvency, they must seek (1) relief from the unfair competition to which the railways are being subjected; (2) reductions of wages; (3) advances in rates, or all of these. They can secure none of them without the support and co-operation of the public and public authorities. If they seek such support and co-operation and do not get them they will have done their full duty, and the responsibility for the results will rest upon public authorities and the public, which will be the principal sufferer if the outcome is a serious disaster.

## The Railway Age Turns Prophet

One of the most interesting exhibits at the American Railway Association, Mechanical Division, convention at Atlantic City, N. J., last June was a Baltimore & Ohio 95-ton hopper coal car, built at the Mount Clare shops of the railroad, and notable for the general substitution of fusion welding in place of rivets and bolts in the superstructure of the car. With mechanical developments proceeding at their present pace, courage is required to predict tendencies in either car or locomotive design, and the *Railway Age* points with pleasure to the following editorial comment regarding the B. & O. car and the possible increased use of welding in car construction, published on page 1548D56 of the daily edition of June 23, 1930: "Having in mind the remarkable developments that have been made in fusion welding processes and the apparatus now available, an inspection of this car inevitably leads one to wonder if it is not a forerunner of what will before long become general practice. It would seem as though other roads and car builders are well warranted in giving this process extended investigation and test."

While not necessarily inspired by the editorial, such investigations and tests have nevertheless been made and five new 70-ton hopper cars, designed for the Chicago Great Western, incorporate fusion welding in the superstructure to an extent permitting them to be described accurately as all-welded cars. The principal difference between the B. & O. car and the C. G. W. Pullman-built car described in the *Railway Age* of May 9, page 902, is that the former is made largely of structural steel shapes and plates joined by fusion welding, whereas practically no structural steel shapes are used in the latter. Even the center sill is made of a one-piece welded tubular steel section.

While the welded construction is designed to produce a number of advantages, such as corrosion-resistance, improved self-clearing in unloading, and strong unit framing and structural design, the feature which will appeal particularly to railway operating and traffic officers is the substantial reduction in light weight of approximately 7,000 lb. from that of a car of the same

nominal capacity, but embodying riveted construction. The C. G. W. all-welded car is designed so that this saving in weight can be replaced by pay load, and an additional advantage, from a transportation standpoint, is the reduced expense for the movement of tare or dead weight, both when the car is loaded and when moving without load. Owing to the reduction in light weight, as well as increased cubic capacity, the tare weight per cu. ft. of the welded car is about 14-1/3 lb., as compared to 17 lb. for the riveted car, all represented by reduced body weight, as the trucks are the same in each case. Eighteen per cent more pounds of coal per lb. of light weight may be carried without exceeding the axle capacities.

The C. G. W. all-welded 70-ton hopper cars are a striking innovation in the design of this class of equipment and are said to have the largest cubic capacity and the lightest weight of any hopper cars having 6-in. by 11-in. journals. They were tested thoroughly during the course of construction, and, upon completion, were given severe static and impact tests. They have now been delivered to the road and their subsequent performance under service conditions should give a good indication of the future possibilities of fusion welding in car construction.

## The Significance of the Pennsylvania Plan

The plan of the Pennsylvania with respect to the movement of demountable truck bodies between New York and Philadelphia, Pa.,—referred to by Elisha Lee, vice-president of the road, in an address before the National Petroleum Association at Cleveland, Ohio, on April 24—is arresting in its possibilities. Briefly, the situation is this. There is a large volume of traffic moving by truck between New York and Philadelphia. Naturally the railroad would like to handle this traffic. Investigations indicated that the cost to a truck operator of running a loaded truck with a 20-ft. body between New York and Philadelphia is about 30 cents a mile. Further studies indicated to the management of the Pennsylvania that it could profitably handle such truck bodies by railroad for a rate of 15 cents a mile. In other words, the Pennsylvania can and proposes to offer a rate covering the movement of truck bodies by rail which will cut in half the cost involved at present in moving such bodies over the highway by motor truck.

If this plan should be put into effect and should prove successful, it would convert competitors into customers, a transformation greatly to be desired. Officers of the Pennsylvania have voiced their expectations of several benefits from this proposal. They say that it will make possible a measurable saving to shippers in their transportation charges. They point out that it should be of benefit to the truck lines by enabling them to

reduce by 50 per cent the operating expenses involved in handling their traffic between terminals. They anticipate that it will result in immediate benefit to the railroad through the recovery of traffic, and through its handling on an operating basis which will make that traffic show a profit.

There is a significance to this proposal which goes beyond the fact that the Pennsylvania is setting up a new form of co-ordinated transportation. The most significant fact is that reduced rates, in this case, will be offset or more than offset by reduced operating expenses. The proposed rate, 15 cents a truck body mile, obviously offers a lower rate than the l.c.l. class rates now in effect. The l.c.l. rates between New York and Philadelphia on the first four classes are 41½ cents a hundred, 34 cents, 28½ cents and 22½ cents, respectively. A 20-ft. truck body will readily accommodate 10,000 lb. of freight. The distance between New York and Philadelphia being 91 miles, the charge for the movement of a loaded truck body at 15 cents a mile would be \$13.65. An estimated load of 10,000 lb. per truck body, therefore, would be moved at the rate of 13.65 cents per 100 lb.

It is said that under the ordinary method of handling l.c.l. freight, the terminal charges, particularly in such congested centers as New York and Philadelphia, ordinarily absorb most, if not all, of the freight charges on traffic moving as short a distance as 90 miles. The profit to the railroad in handling l.c.l. freight over short distances in the ordinary way at the existing class rates is doubtful. In spite of this, it is the opinion of the Pennsylvania that, even with a greatly reduced proportionate revenue, it can handle freight in truck bodies and still show a definite profit. That such expectation is reasonable is indicated by the fact that three truck bodies loaded on a car for movement between New York and Philadelphia would bring a revenue to the railroad of 45 cents a car mile.

Obviously the answer to the seeming paradox of lack of profit at a high rate and profit at a low rate lies in the change in the method of handling the freight. Terminal expense, which has tended to make unprofitable the handling of l.c.l. freight over short distances by rail, will be, to a large extent, eliminated under the plan proposed by the Pennsylvania.

The consensus of all authorities is that co-ordination is the only way out of the competitive situation in which the railways find themselves. Competition is keen, the railroads are losing traffic to their competitors, and there is an urgent necessity for positive action, such as the Pennsylvania is taking in this instance, as it has in others. Co-ordination may involve revolutionary changes in existing methods of handling traffic. But in studying the possibilities of the plan now proposed by the Pennsylvania, is there not reason to expect that such changes will work to the advantage of shippers and carriers alike, offering improved service to shippers at lower costs and enabling the railways to turn dried up sources of revenue into revived sources not only of revenue, but also of profit?



# Baldwin Celebrates Its Hundredth Birthday

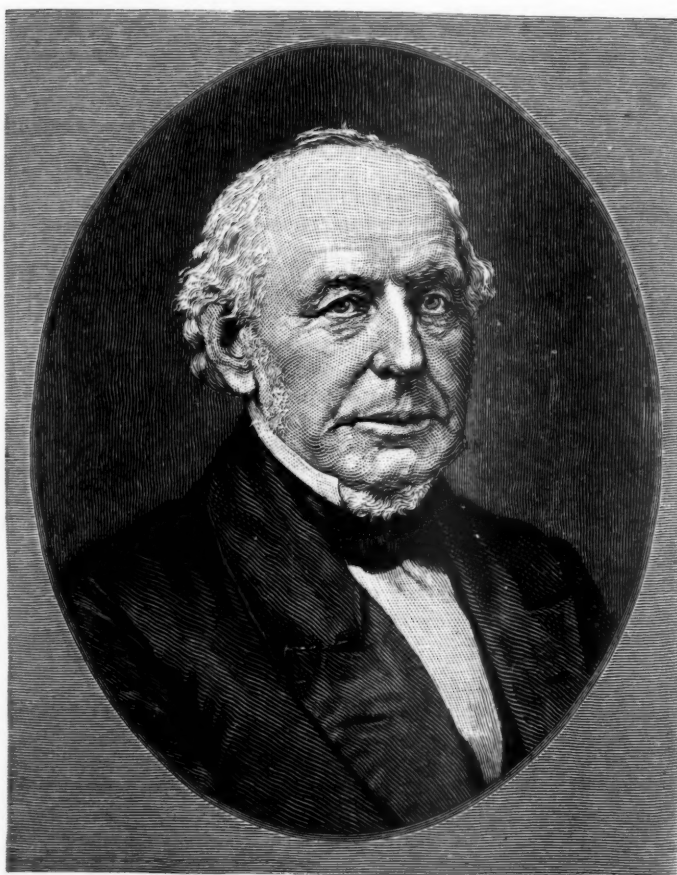
Its history is unique among industrial enterprises—  
Founder's character still vital in traditions  
of the institution

IT IS a notable event when any industrial enterprise in America has survived the vicissitudes of a century and lived to celebrate its one-hundredth birthday. Founded by Matthias W. Baldwin, when he undertook to build a miniature steam locomotive for the Philadelphia Museum in 1831, The Baldwin Locomotive Works has shared the entire life of steam transportation, growing with the railroads, without a break in the continuity of the enterprise or its management. So marked has been this continuity that men in the service of the corporation today speak familiarly of the work of the founder and his associates, and there are few men in positions of responsibility in the present organization who do not know and take pride in its traditions.

No more striking evidence of the strength of character and soundness of the ideals of the founder need be sought than that 65 years after his death—years during which vast changes have taken place in the character of American industry—those ideals still influence the conduct of the enterprise.

Matthias Baldwin was an able craftsman, an ingenious inventor and a man who adhered to a chosen course with a fixity of purpose which sometimes amounted to stubbornness.

His ingenuity and skill as a mechanic stood him in good stead during his early ventures in locomotive building. Machine tools were few and crude and few mechanics competent to enter this new field were available. It is said that few blacksmiths could be found who could weld a bar of iron larger than  $1\frac{1}{4}$  in. thick and that cylinders had to be bored with a chisel fixed in a block of wood, turned by hand. For years, therefore, his endeavors were as much concerned with finding new shop



*Matthias W. Baldwin*

methods and practices to keep a head of the requirements of the new industry as in the development of the product itself.

Many of his inventions pertaining to the locomotive were essentially those of the craftsman interested in improving construction and in simplifying production and maintenance. This is well illustrated by four improvements patented in the autumn of 1834, all of which were probably embodied in some of the five locomotives built by Mr. Baldwin that year. These were the half crank, driving-wheel centers with segmental rims, ground steam-pipe joints and a simplified boiler feed pump.

*The Half Crank.*—This applied to driving wheels with outside journals and inside cranks. The invention consisted in eliminating the outside crank cheek and securing the outside end of the crank pin directly in the wheel center. It simplified the crank-axle structure and

increased the space between the wheels for the boiler.

*Driving-Wheel Centers with Segmental Rims.*—The wheel center was of cast iron, but without a rim. Each spoke ended in a flange. To these flanges wooden fellies were attached and the tire secured by bolts to the fellies. This was to cure the effects of unequal expansion of the metal encountered in the wheels when cast with continuous rims.

*Ground Steam-Pipe Joints.*—The steam-pipe joints of the imported English locomotives which Mr. Baldwin studied were made tight with canvas and red lead. Steam pressures were limited to 60 lb. per sq. in. He invented ground joints and built his locomotives to work at 120 lb. boiler pressure.

*Simplified Feed Pump.*—This invention consisted in



making the main guide bar hollow, to serve as the pump cylinder. The guide terminated in a vertical valve chamber made in two parts. The suction and delivery pipes were attached to the bottom and top of this chamber, respectively, the joints being all ground, metal to metal. The assembly was held together by a stirrup or yoke and a single set screw, thus permitting quick and easy access to the valves.

One other of Mr. Baldwin's early inventions should be mentioned at this time because it illustrates the adaptation of locomotive construction to the shop resources of the day. This was the cylindrical pedestal for driving boxes. The pedestal, which was of cast iron, was bored out in a lathe, with the axis of the cylindrical surfaces coinciding with the vertical center line of the pedestal, thus forming two parallel concave jaws. The outside of the box was also turned in the lathe to fit the pedestal. This method was cheap and the quality of the fit was easily controlled.

Mr. Baldwin's engines established a reputation for "simplicity of construction, small liability to get out of order, economy of repairs, and ease to the road".\* The cost of repairs to some of his locomotives in 1837 is said to have amounted to from 1.2 cents to 1.6 cents per mile.

One situation in which Mr. Baldwin found himself early in his career as a builder of locomotives illustrates his integrity, the courage with which he adhered to his course and the confidence which these qualities inspired in others. During the financial disturbance of 1836-37 he became so financially involved that he was unable to proceed and called his creditors together for a settlement. He offered them two alternatives: First, that he surrender all his assets, including his home, all of which would have realized about 25 cents on the dollar of their claims; second, that they allow him to go on with the business and that he would pay all claims in full with interest within three years. The creditors accepted the latter alternative. Partly as the result of the general business recession and partly as the result of competition from several other newly established locomotive builders, his output declined from 40 locomotives each in 1836 and 1837 to 23 in 1838, 26 in 1839 and 9 in 1840, and Mr. Baldwin had to secure an extension of two years. At the end of five years, however, he had fulfilled his promise.

#### The Institution Mr. Baldwin Founded

One of the outstanding facts in the history of The Baldwin Locomotive Works is that it was operated as a partnership until 1909, before it was incorporated. Not until 1911, however, did its stock become available to the public, when it was reorganized as a public joint stock company under the laws of Pennsylvania. For practically the entire period during which the railroad system of the United States was being laid out and developed, therefore, The Baldwin Locomotive Works was operated and expanded with the resources of its owner-managers. It is one of the few if not the only established major industrial organization in the United States which passed unchanged through the period of great financial reorganizations and mergers started during the early years of the present century.

Early in his career as a locomotive builder Mr. Baldwin sought the association of others in the management of the enterprise. In 1839 he took George Vail and George W. Hufty into the business and the partnership of Baldwin, Vail & Hufty was formed. In 1842 this partnership was dissolved and Asa Whitney

joined Mr. Baldwin in the firm of Baldwin & Whitney. Mr. Whitney had been superintendent of the Mohawk & Hudson. He withdrew from the firm in 1846 to establish the firm of A. Whitney & Sons, which engaged in the manufacture of car wheels in Philadelphia.

Aside from his railroad experience, Mr. Whitney brought to the firm a thorough business talent. He is said to have systematized many of the details of the management of the business which Mr. Baldwin in his preoccupation with mechanical problems had ignored. It was shortly after Mr. Whitney became a partner that the present method of designating locomotive types by letters and numbers, based on the wheel arrangement, had its origin. For the purpose of representing the different types, sheets with engravings of locomotives were employed. Thus, the sheet showing an engine with one pair of drivers was marked "B"; that with two pairs, "C," etc. From this designation of the drawings it became customary to refer to locomotives with one pair of drivers as "B engines"; those with two pairs of drivers as "C engines," etc. A number prefix was soon added which indicated the weight of the locomotive in gross tons. This system, modified and expanded to indicate further information concerning important characteristics of the design, is still employed by The Baldwin Locomotive Works.

Mr. Baldwin continued his business alone until the firm of M. W. Baldwin & Co. was formed in 1854, with Matthew Baird as the partner. Thus began the period of overlapping partnerships which continued in unbroken sequence until 1909.

Mr. Baird had been a foreman in the works since 1836 and it was he who carried on the business following Mr. Baldwin's death in September, 1866. The following year the firm of M. Baird & Co. was formed with George Burnham and Charles T. Parry as partners. Both had been employees of Mr. Baldwin from his pioneer years as a locomotive builder. Mr. Burnham, whose connection with the works began in 1836, continued in the firm until the final partnership of Burnham, Williams & Co., was dissolved in 1909 to make way for the corporation.

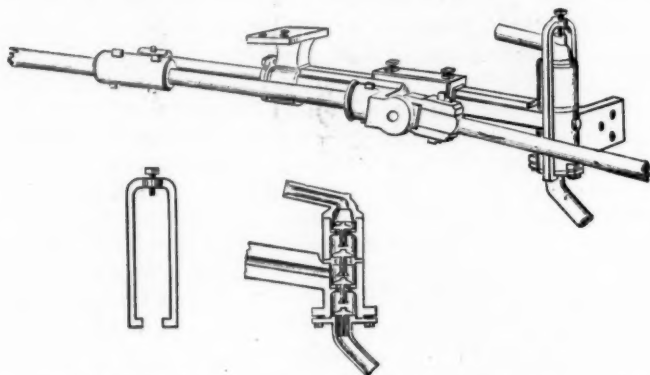
Space does not permit a complete record of the changes in the firm, but two of these are worthy of special comment. In 1873 the other partners bought out Matthew Baird (a transaction said to have involved over a million dollars) and organized the firm of Burnham, Parry, Williams & Co. In addition to Messrs. Burnham and Parry, the partners in the new firm were Edward H. Williams, William P. Henszey, Edward Longstreth and John H. Converse.

The successful conduct and upbuilding of the business was probably due more to the personal contributions by these men and their successors of their ability and personal energy than to their initial financial investment in it. Mr. Burnham had for some time been in charge of the financial affairs of the business. Mr. Parry had been general superintendent, in charge of the operation of the works. Mr. Williams, who had been brought into the business as a partner in 1870, contributed a broad experience as a railroad officer and a wide acquaintance among railroad men, which fitted him to handle sales. Mr. Henszey, who was mechanical engineer and had been an employee since 1859, was largely responsible for the standardization of locomotive details, and had perfected a system for manufacturing interchangeable parts for locomotives of the same class. He had also designed many unusual types of locomotives to meet difficult service requirements. Mr. Longstreth had succeeded Mr. Parry as general superintendent. Mr. Converse, who became a partner in 1878, had been associated with

\* From a letter written by L. A. Sykes, engineer of the New Jersey Transportation Company on July 12, 1838.

Mr. Williams in a clerical capacity during the latter's railroad days and was brought in by Mr. Williams in 1870 to organize and improve the office work and accounting.

This brief survey of the partnership of 1873, suggests that, while men were brought into the management from outside to meet special conditions, most of the

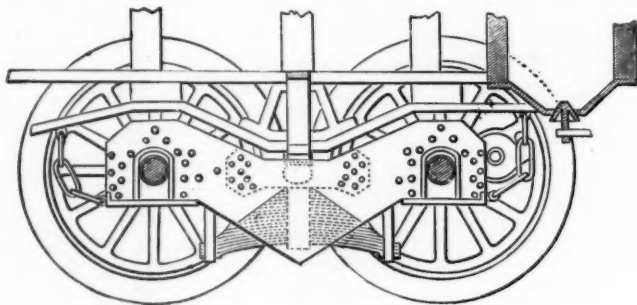


The Boiler Feed Pump—The Parts of the Valve Chamber and the Pipe Connections, Made Tight by Ground Joints, Are Secured by a Single Set Screw

partners had served years of apprenticeship in the business before assuming responsibility for a part in its management.

It was during this partnership, in 1875, that the firm acquired a controlling interest in the Standard Steel Works which had been incorporated in that year by the creditors of the former proprietor, William Butcher.

In 1896 three new members were admitted to the partnership. These were Samuel M. Vauclain, Alba B. Johnson and George Burnham, Jr.\* Messrs. Vauclain and Johnson, and William L. Austin, who became a



Elevation and Half Plan of Baldwin's Flexible-Beam Truck for Six- and Eight-Wheels-Connected Locomotives

member of the firm in 1886, are all widely known among the present generation of railroad men.

#### The Corporation

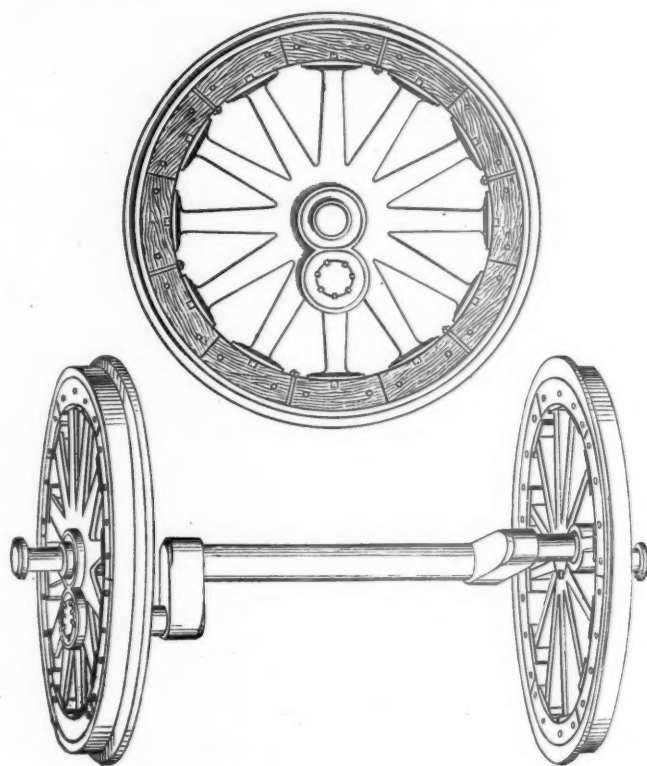
In 1899, prior to the death of Edward H. Williams, there were eight partners. During the next decade the number had been reduced by death or withdrawal to five, one of whom was past 90 years of age. The

\* Mr. Burnham withdrew from the firm in 1906. He is now deceased.

financial burden thus placed on the remaining active members led to the incorporation in 1909. The following year \$10,000,000 of first mortgage bonds were issued, the first public financing in the history of the institution. In 1911 the present corporation was organized, with William L. Austin as chairman of the board, Alba B. Johnson, president, Samuel M. Vauclain, vice-president, and William de Krafft, secretary and treasurer.

In 1919 Mr. Johnson resigned from the presidency. He had been continuously connected with the institution from 1879 when he became an assistant to John H. Converse.

Mr. Johnson was succeeded as president by Mr. Vauclain, whose career typifies the character of the management which had prevailed throughout the history of The Baldwin Locomotive Works. Entering the service of the works in 1883 after having served there as an inspector for the Pennsylvania Railroad, Mr. Vauclain was made general superintendent early in 1886 in the



The Rimless Wheel Center and Half Crank Patented by Mr. Baldwin in 1834

reorganization following the retirement of Edward Longstreth as one of the partners. Ten years later he became a partner and served as a director of the first corporation. When the present corporation was organized in 1911, Mr. Vauclain was elected vice-president and a member of the board of directors, and he became senior vice-president later in that year. During the war he directed a number of subsidiaries of The Baldwin Locomotive Works which were organized to produce arms and ammunition for the Allied governments and later for the United States government. He also rendered the nation a notable service during the war as chairman of the War Industries Board. After the war, Mr. Vauclain took an active part in the successful efforts of The Baldwin Locomotive Works to secure orders for export business. On March 28, 1929, he was elected chairman of the board of directors and was succeeded as president by George H. Houston.

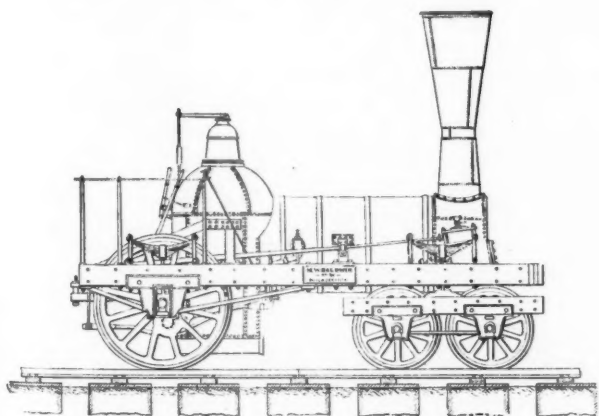
During his long service with The Baldwin Locomotive



Works not only was he actively engaged in dealing with the problems of development and expansion of the manufacturing facilities, but he was the father of numerous developments in locomotive construction, for a number of which patents were granted to him. The pride of craftsmanship which was an outstanding characteristic of the founder of the institution and which showed itself in finding ways to do new and difficult jobs, was evident in a marked degree in Mr. Vaucrain's career in taking orders for seemingly impossibly quick deliveries and finding ways to make them. He never lacked courage to take bold measures, either in dealing with the problems of production or in providing locomotives to meet unusual operating conditions. That not all of these measures proved wholly successful or find a permanent place in the art of locomotive construction should in no way becloud the fact that Mr. Vaucrain, with his strong personality and individualism, representing the old school of owner-management, was a large factor in the success of The Baldwin Locomotive Works for many years. For his accomplishments he has achieved a permanent place in the annals of American business.

### Baldwins Grew with the Railroads

The history of the growth and development of The Baldwin Locomotive Works parallels the history of the

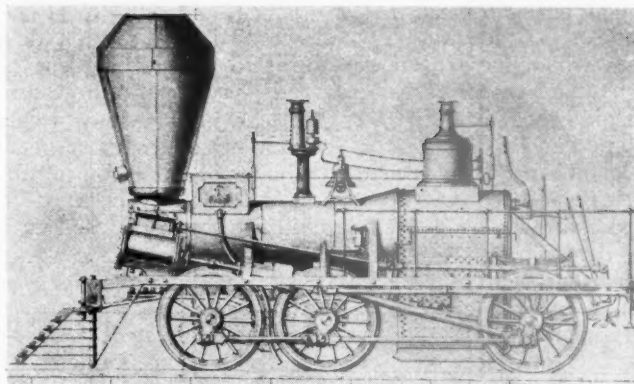


A Baldwin Locomotive of 1834—Mr. Baldwin Placed the Driving Axle Back of the Firebox To Secure a Longer Wheel Base, Better Riding Qualities, and Less Damage to the Track

growth of steam railroad transportation in America. Beginning with the period when steam locomotives were a public curiosity and when the future place of the steam railroad in the economic life of America was still a matter of controversy, the facilities and output of the Works grew as the increase in railroad mileage and traffic density created a constantly increasing demand for locomotives.

It would be impossible in the scope of a single article to record all of the events in the early evolution and the later development of the steam locomotive in America in which the men in The Baldwin Locomotive Works played a part. Because of their general significance, however, a few of these events will be dealt with.

Within ten years after Matthias Baldwin had built Old Ironsides for the Philadelphia, Germantown & Norristown Railroad, the problem of increasing adhesion and tractive force was becoming acute. Use was made of four-coupled driving wheels with a four-wheel leading truck in a locomotive designed by Henry R. Campbell in 1836. Mr. Baldwin, however, did not take kindly to this wheel arrangement and after he had attempted to solve the problem by building an experimental geared

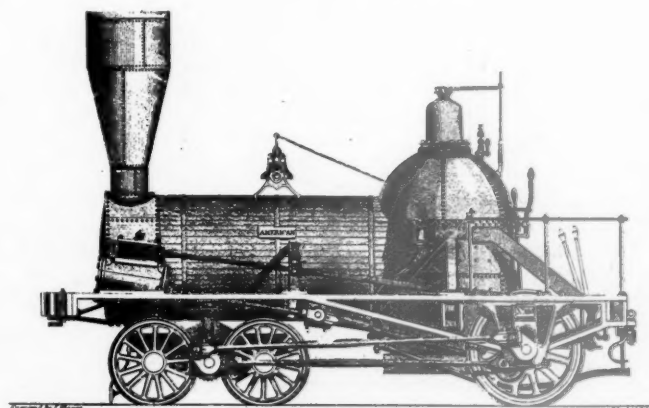


A Six-Wheels-Connected Locomotive of 1842 Employing the Flexible-Beam Truck

locomotive of the 4-2-0 type, he finally effected a solution of the problem which was successfully embodied in many locomotives from 1842 to the early sixties.

This was a scheme for a six-wheels connected locomotive in which the entire weight of the locomotive was available for adhesion and the necessary flexibility for rounding curves was provided by the flexible-beam truck composed of the two leading pairs of drivers. The principle on which this truck operated is shown in the illustrations. The rear driving wheels were placed rigidly in the frames, usually behind the firebox, with inside bearings. The inside bearings at the ends of the two front driving axles ran in boxes which were mounted in the ends of two deep double wrought-iron beams, one on each side of the locomotive. The two pairs of beams were not connected and a spherical pin projecting downward from each main locomotive frame rested in a socket in the top of the beam midway between the two driving boxes. The pedestals and the driving boxes were of the cylindrical type to which reference has already been made. With this construction the two leading driving axles were free to move laterally in opposite directions, but always remained parallel. The connecting rods were made with spherical brasses to accommodate themselves to the lateral movements of the wheels, while the shortening of the longitudinal distances between the pins due to the angularity of the rods was too small to be of practical consequence.

The first locomotive of this type was built for the Georgia Railroad in 1842. It weighed 12 tons and pulled a trailing load of 250 tons up a grade of 36 ft. per mile. While this scheme did not attain permanence as a feature of locomotive construction it met the needs of its day admirably and was not entirely superseded in new con-



From the Journal of the Franklin Institute, Vol III.

Baldwin's Geared Locomotive



struction until after 1860. It has its counterpart in modern practice in the form of the lateral-motion devices which have been developed to extend the length of coupled wheel bases beyond the practicable limits of a rigid wheel base.

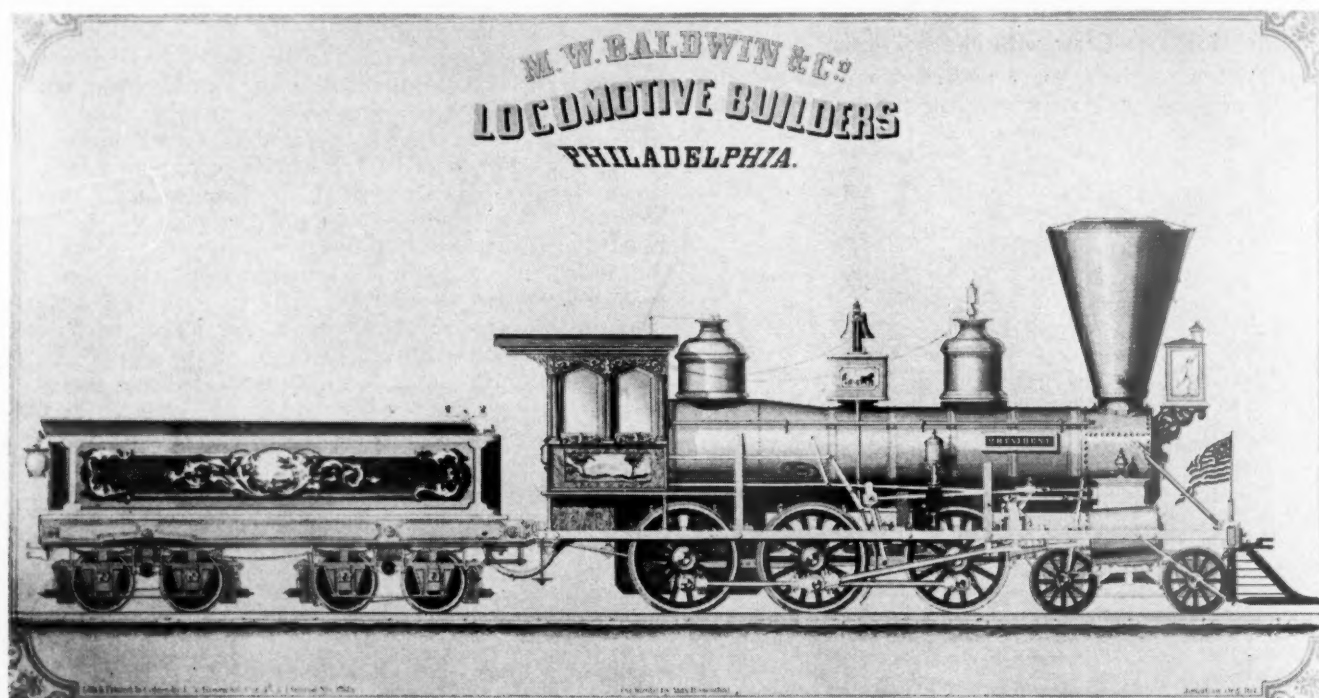
The early fifties are particularly notable with respect to locomotive development for the rapid extension in the use of the link motion with double eccentrics, permitting a variable cut-off. Mr. Baldwin strongly opposed the use of this motion on theoretical grounds which, while correct in themselves, proved not to be seriously detrimental in practice. After a determined effort to prove the superiority of his own scheme for effecting a variable cut-off, however, in common with a number of other builders who had been equally strongly opposed to its use, he adopted the Stephenson link motion as a regular feature of the locomotives turned out of the Baldwin shops.

Among the interesting developments of the sixties may be mentioned the growing use of steel in various parts of locomotive construction. Steel fireboxes were first ap-

tribution to this development by The Baldwin Locomotive Works was the Vauclain compound which was patented by Samuel M. Vauclain, then general superintendent of the Works, and first applied to a Baltimore & Ohio locomotive turned out of the shops in 1889.

In 1895 a locomotive with the customary four-wheel leading truck, two pairs of coupled wheels, both placed in front of the firebox, and a pair of trailing wheels under the firebox was built by Baldwin for the Atlantic Coast Line, and this wheel arrangement became known as the Atlantic type. Although the firebox in this locomotive did not assume the characteristic form of modern trailer-borne fireboxes, advantage was taken of the opportunity offered by the trailer to place the mud ring above depressed frames and thus increase the firebox volume without unduly raising the center of gravity.

It was also during 1895 that The Baldwin Locomotive Works built its first electric locomotive. The electrical parts of this locomotive, which was built for the North American Company, were designed by Sprague, Duncan & Hutchinson, electrical engineers, of New York. A



An Early Ten-Wheel Locomotive Built for the Cleveland & Pittsburgh in 1856—Baldwin's First Ten-Wheel Locomotive Was Built for the Pennsylvania in 1852

plied to locomotives built by the Baldwin Works in 1861. The first application, on some locomotives built for the Pennsylvania, was of an English steel of high temper which cracked while the sheets were being fitted and it became necessary to replace the steel firebox with copper. The so-called homogeneous "cast steel" of American manufacture was then tried out on two locomotives completed early in 1862 for the Pennsylvania. This material was found to work successfully and by 1866 its use had become general.

The Baldwin Locomotive Works also made its first application of steel tires in 1862. These tires were imported from Germany and, in order that a supply might be available in this country for replacements, Mr. Baldwin imported and carried a stock of some 500 tires.

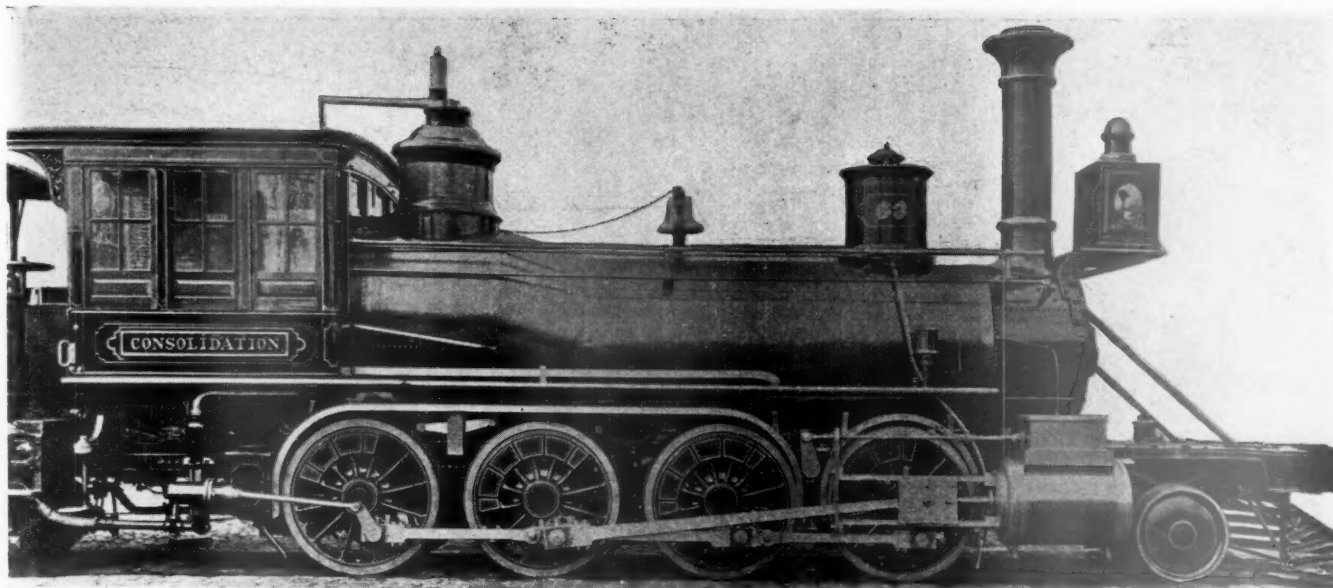
An event of outstanding importance in the development of American locomotives was the application of compounding which made rapid progress during the last decade of the nineteenth century. The most notable con-

tribution to this development by The Baldwin Locomotive Works was the Vauclain compound which was patented by Samuel M. Vauclain, then general superintendent of the Works, and first applied to a Baltimore & Ohio locomotive turned out of the shops in 1889.

year later two locomotives were built for mining operations in co-operation with the Westinghouse Electric & Manufacturing Company, which supplied the electrical equipment. This was the forerunner of a co-operative arrangement under which these two companies have participated in the building of electric locomotives for many years.

#### The Growth of the Locomotive Market

During nine of the ten decades of Baldwin's history there was a steady growth in the mileage of steam railroads in the United States, the rate of growth accelerating rapidly from 1870 to 1890, decreasing somewhat for the next two decades and declining rapidly between 1910 and 1920. Since that time the extension of mileage has ceased and more miles have been abandoned than have been built. For most of the thirty years from 1890 to 1920 there was a steady increase in traffic density, revenue ton-miles of freight traffic doubling each twelve



The Locomotive Which Named a Type—Built in 1866 for the Lehigh Valley

years. The table shows that during this period of rapid growth the number of locomotives in service more than doubled and the number built by Baldwin more than trebled.

The slow growth in the volume of Baldwin's output during the decade from 1840 to 1850 may be accounted for in part at least by the fact that during that decade the major increase in mileage was in the New England states, which looked to builders geographically nearer at hand. After 1850 construction of railroads in New England declined and during the next decade the skeleton of the railroad system of the Middle and South Atlantic states was rapidly filled in and the system in the states east of the Mississippi was assuming the form of its subsequent development. While the crisis of 1857 and the Civil War put a stop to the growth of railway mileage, particularly in the west, the demand for transportation by the federal government and by the branches of trade and industry stimulated by the war increased the demand for locomotives. The government itself became a large purchaser of locomotives, and in 1864, when Baldwin's production reached its maximum for the war period, 33 of the 130 locomotives built were for the United States military railroads.

During the decades of growth and development of

the railroad system in the United States The Baldwin Locomotive Works grew from a shop employing some 300 men in 1837 to an aggregation of shops employing a maximum of 21,500 men.

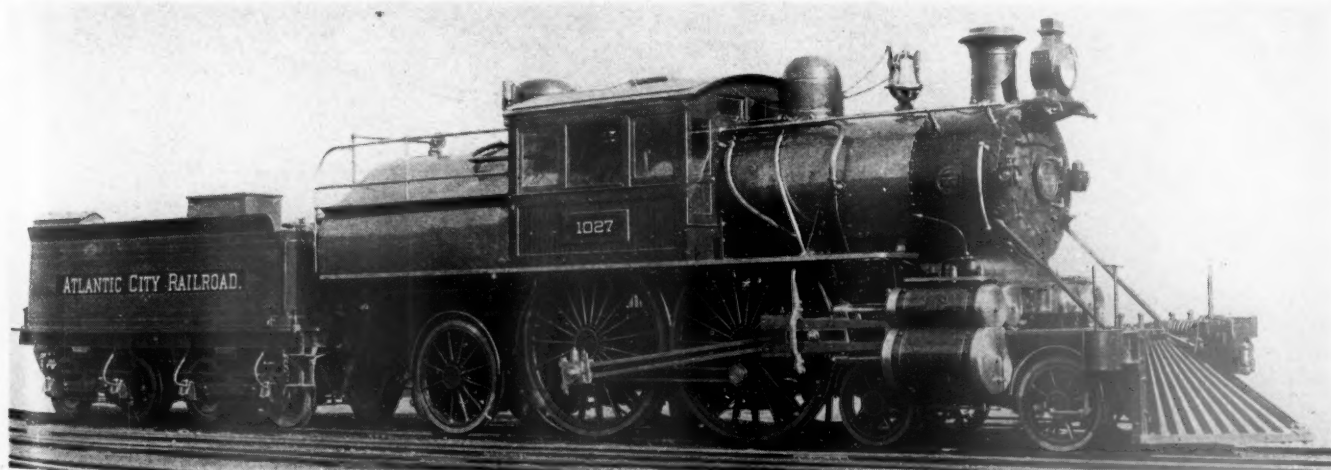
After having expanded steadily on land now within

#### Growth of the Railroads and of Baldwin Output

Decade ending	Miles in operation	Increase during decade	Number of locomotives in service	Baldwin output during decade
1830	23	23	.....	.....
1840	2,818	2,795	.....	158
1850	9,021	6,203	.....	251
1860	30,635	21,614	.....	579
1870	52,922	22,287	.....	1,340
1880*	93,262	40,340	.....	3,049
1890	163,597	70,335	30,140	6,058
1900	193,346	29,749	37,663	7,037
1910	240,439	57,093	58,947	17,302
1920	252,845	12,406	66,867	18,518
1921-1929	249,433	-3,412	58,746	6,829

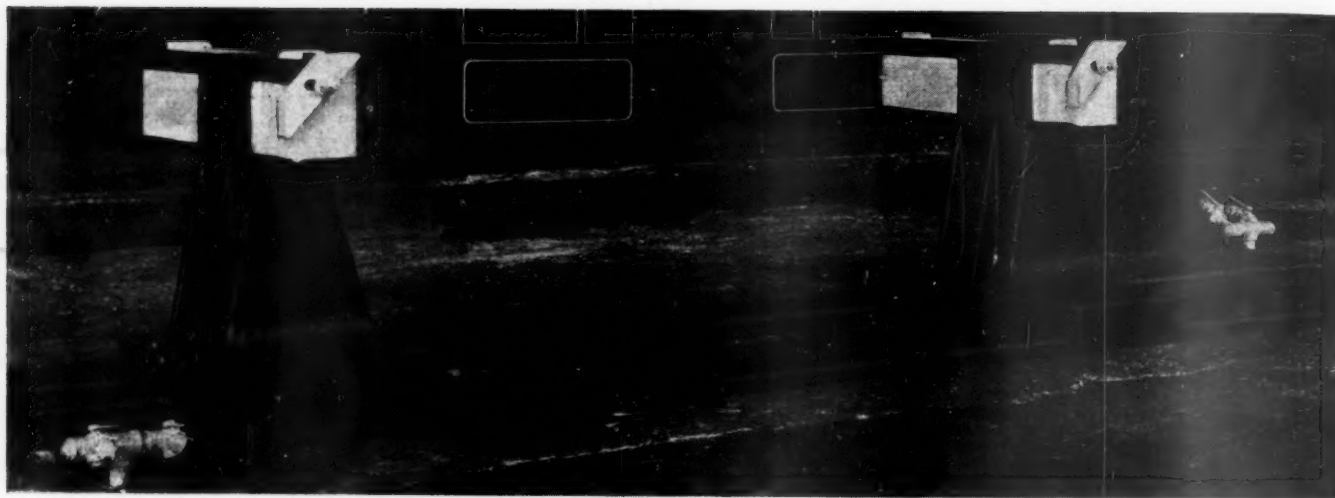
\* The mileages for the decades up to 1880 are taken from Poor's Manual of the Railroads of the United States. Subsequent figures for mileages and locomotives in service are from Interstate Commerce Commission Statistics.

the heart of the City of Philadelphia, it ultimately became necessary to find more room for further expansions. Accordingly in 1906 a site of 184 acres was purchased at Eddystone, Pa., and the foundries and



A Famous Vaucain Compound Built in 1896—This Locomotive Regularly Made 55½ Miles in 50 Minutes from Start to Stop





An Adjustable Jig which Greatly Simplifies the Alinement of Frames in the Erecting Shop

blacksmith shops were established on this property. At various times during the next twenty-two years additional departments were transferred to new quarters erected at Eddystone, some of them in buildings which were first used for the production of munitions during the war. Since the transfer of the last department in June, 1928, the Eddystone plant of The Baldwin Locomotive Works, now occupying sites aggregating 518 acres, presents a picture of well integrated and co-ordinated facilities that it falls to the lot of few industries developed over so long a period to possess.

#### A New Trend

The facts with respect to the growth of railroad mileage set forth in the table clearly indicate the marked change in the trend of the railroad industry which has taken place since the World War. This change is further indicated by the trends in railroad traffic. The volume of passenger-traffic, measured in passenger-miles, declined from 46.8 billions in 1920 to 31.1 billions in 1929, or 33.5 per cent, while the rate of increase in revenue freight traffic during the same period was very slight as compared with the geometrical progression of billions of ton-miles in 1920, freight traffic increased to

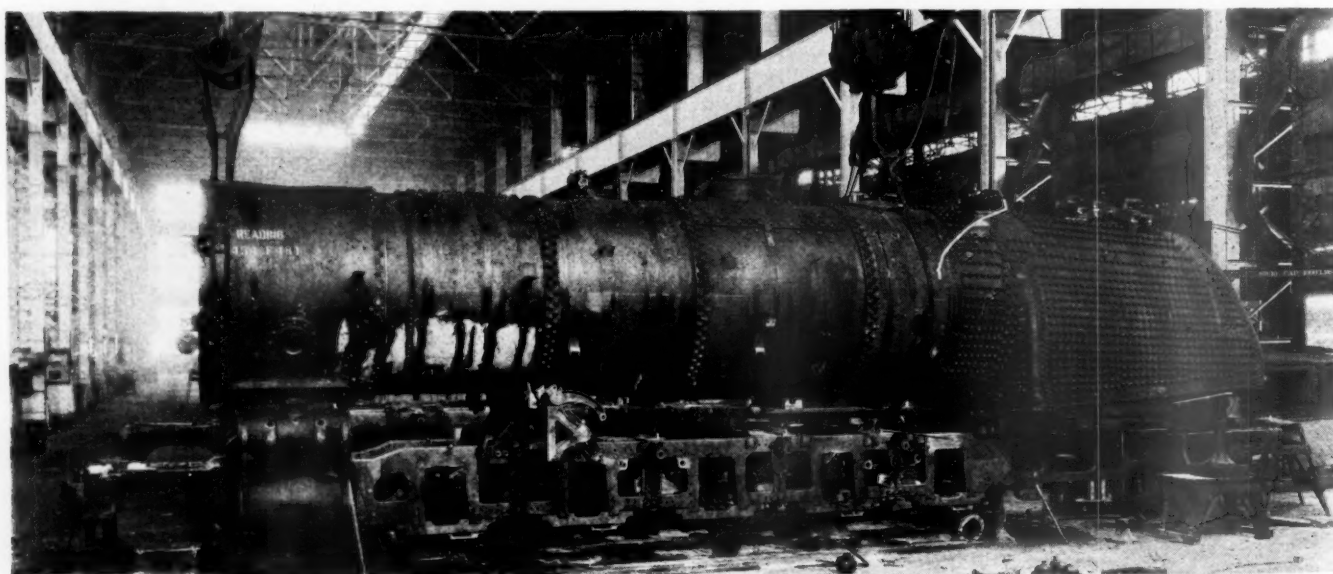
the growth for many years prior to that time. From 410 447 billions in 1929—only nine per cent in nine years.

In just what form this change will be projected into the future it is impossible to say with any degree of assurance.

There are, however, numerous indications that a period of relative stability has been reached, partly as the result of changes in the industrial growth of the country and partly as the result of the development of other forms of transportation.

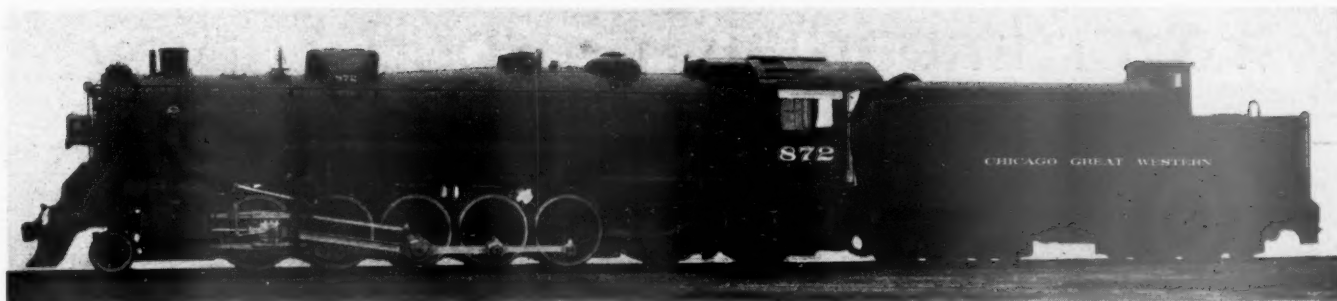
These changes have had a marked influence on the demand for locomotives during the past few years—which may be regarded as a transition period—and undoubtedly have effected a change in the nature of the future motive-power needs of the railroads.

Throughout the first nine decades of American railroad history the compelling motive for the purchase of locomotives was the need for more locomotives to equip new mileage and to move new traffic. The question of obsolescence was not one requiring much consideration on the part of the railroad managements. It is true that locomotives became obsolete and were scrapped, largely because of inadequate tractive capacity. In the main, however, the character of the motive power in



A Locomotive Takes Shape in the Erecting Shop





Old Ironsides" Weighed Something Less Than 6 Tons in Working Order—This Locomotive Weighs 232 Tons in Working Order, Exclusive of the Tender

operation was kept in step with improvements in motive power design automatically as the demand for more and more locomotives was satisfied.

Improvements in motive-power efficiency and capacity have not ceased with the growth of railway mileage or with the stabilization of the volume of traffic. Indeed, the last decade has been one of unusual activity in improving locomotive design, and it has seen the beginning of marked innovations which promise further important improvements in efficiency for the future. Modern locomotives of the kind extensively built within the last five years have demonstrated their ability under a wide variety of conditions to effect an average reduction in unit fuel consumption of 30 to 40 per cent as compared with locomotives designed but a few years earlier and may be expected to earn a net return on the investment of from 10 to 20 per cent.

#### Obsolescence Takes on New Meaning

If the application of modern motive power must await the development of a demand for more locomotives than are already in service, it will be many years before the railroads will have realized any practical benefit from what is ready for their use today, and the developments in the art of locomotive design and construction which have made large numbers of locomotives obsolete which

were built even less than ten years ago will have been in vain.

While the volume of railroad traffic was increasing rapidly, the greatest opportunities for increasing net operating income lay in providing facilities adequate to handle all the business offered. With the opportunity for increasing revenues greatly curtailed or entirely eliminated, future opportunities for improvement in net operating income must depend more and more on reducing expenses.

The extent to which the railroads have met this situation by improving the efficiency of many phases of their operations is sufficient evidence that they will not long continue to overlook the opportunities in this direction by retiring and replacing their obsolete locomotives.

With the election of Mr. Houston as president in 1929, a major step was taken in the transition of the actual management of The Baldwin Locomotive Works from the personal owner-management implicit in the many years of its operation as a partnership to that of a modern industrial corporation. As the new century opens, the development of new methods of merchandizing which faces the locomotive building industry, as the result of the transition through which the railroad industry is passing, is a major problem of the new management.

\* \* \* \*



Moving Freight Over the Mountains on the Southern Pacific

# Favor Impartial Transport Survey

Associated Traffic Clubs of America recommend formation of unprejudiced national body to sift claims of competing agencies

THE formation of a national body to make an economic study of regulation of all forms of transportation and propose a basis for determining the merits of the contentions of operators of railroads, inland waterways, steamship companies, and motor coaches and trucks was recommended by the board of directors of the Associated Traffic Clubs of America at its semi-annual meeting at Chicago on May 6 and 7. This proposal to have an unprejudiced group of men solve the transportation question on the basis of economics, was made following conflicting statements by representatives of the various parties in interest and a general refutative discussion by those who attended the meeting. As a means of bringing about the formation of such a body, the board appointed a committee consisting of Dr. Howard C. Kidd, professor of transportation of the University of Pittsburgh, and Lewis C. Sorrell, professor of transportation of the University of Chicago, to make a study of the feasibility of the plan and report at the annual meeting to be held at Tulsa, Okla., on October 28 and 29.

The program of the meeting, which was attended by 500 traffic representatives of railroads and shippers, included addresses by T. R. Dahl, president of the White Company, on "Highway Transportation"; by Samuel O. Dunn, editor of the *Railway Age*, on "Our National Transportation Problem"; by Dr. Howard C. Kidd, professor of Commerce of the University of Pittsburgh, on "One Phase of a Program of Regulation"; by Major-General T. Q. Ashburn, chairman of the Inland Waterways Corporation, on "Inland Waterways"; and by H. B. Walker, president of the American Steamship Owners' Association, on "Coastwise and Intercoastal Steamships." At a banquet given on the evening of May 6, W. H. Day, president of the National Industrial Traffic League and manager of the transportation bureau of the Boston Chamber of Commerce, spoke on "A National Transportation Problem," and Carl R. Gray, president of the Union Pacific, on "Human Equation in the Railroad Business." Mr. Dunn's address will appear in an early issue of *Railway Age*.

## Highway Transportation Discussion Critical

Following Mr. Dahl's address on highway transportation, several attending the meeting took exception to some of his statements. Mr. Dahl said that the attitude toward motor coaches and trucks would be more favorable had the motor interests issued constructive statements in the beginning instead of defending themselves against the attacks of the railroads. He also said that motor coaches and trucks were not a determining factor in road construction, for if there was none of these vehicles, the government would still be building 9,000-lb. load pavements to resist frost and weather. According to Mr. Dahl, motor coaches and trucks constitute 12 per cent of the vehicles using the highways but pay 27 per cent of the special taxes.

He maintained that railroads did not lose their passenger business to motor coaches but to privately owned

automobiles, and that intrastate motor coach regulation exists in all states but one. Motor trucking, he said, is not a transportation system but a tool of business—a plant facility. To support this, he stated that 82 per cent of the 3,500,000 trucks in the United States are shipper owned, 11 per cent operate under contract, 5 per cent are intrastate common carrier and 2 per cent are interstate common carriers.

He did not believe that an interstate regulation of trucks is necessary because the common carrier truck is subject to the competition of the contract truck and if the former is regulated, it can not operate. In conclusion, he stated that the shipper will ultimately decide what kind of transportation he wants and if the purveyor of transportation can not provide it, he is unfortunate.

In the general discussion, Professor Sorrell said that Mr. Dahl presupposed that there was no general subsidy of highway operation, and contended that trucks do require heavier road construction, that motor coaches did take much passenger business from the railroads and that perhaps the alleged regulation of motor vehicles is not enforced. A. W. Vogtle, traffic manager of the De Bardeleben Coal Corporation, Birmingham, Ala., described the motor truck situation in the south, saying that the truck is a greater curse to the south than Sherman's march to the sea.

Charles Barham, vice-president and traffic manager of the Nashville, Chattanooga & St. Louis, said the burden placed on the private autoist by truck and coach operation has been greatly minimized. In Tennessee, he continued, paving cost \$28,000 a mile, but if trucks of over 12 tons were kept off the road, they could be built for half that amount. Mr. Barham also stated that the private automobile is being discriminated against and unnecessarily taxed since the coaches and trucks are only paying 3.5 per cent of the gas tax of the state, that gas tax and license fees are not paying the interest on road bonds in Tennessee and that the open highway is not for the man who uses it to make a living at another's expense.

## A National Transportation Policy

Dr. Kidd, in speaking on "One Phase of a Program of Regulation," pointed out the fallacy of distinguishing between interstate and intrastate commerce, saying that the reason for the distinction rests upon that clause in the Federal Constitution which gives to Congress the power to regulate commerce among the states. Since the powers not granted to the Federal government are reserved to the states, the states retain the right to regulate commerce within their own boundaries. He cited many cases to illustrate the effect of this distinction.

"At the present time," he said, "the Interstate Commerce Commission cannot assert its authority until it can be shown that an intrastate rate has actually obstructed interstate commerce and in spite of some advances that have been made in our national view of commerce, state control is still effective enough to



thwart the adoption of policies based on broad economic lines."

While discussing a workable remedy for the inconsistencies associated with a distinction between interstate and intrastate commerce, he said the easiest solution would be an amendment to the constitution giving to Congress the power to regulate intrastate as well as interstate commerce, but a solution of this general problem will come at the initiative of the state commissions themselves. "While the latter are in a position to initiate policies that would frankly concede the national character of commerce," he continued, "we must admit that they would be only human in refusing to surrender their present control over rates. It seems, therefore, that in addition to a liberal attitude on the part of the supreme court, the only practical way out of the impasse lies in the assertion of the federal government that any order of a state commission respecting rates may be suspended and subject to review by the Interstate Commerce Commission before it becomes effective."

In summarizing, he concluded, "It is the business of vigorous minds to accept the challenge of events all around us and to plan a national transportation policy that will keep pace with the technical and economic progress of the age. If such planning is intelligent and courageous, there is little doubt that the resulting program of regulation will ultimately wipe out all artificial distinctions between interstate and intrastate commerce."

#### Inland Waterways Defended

Major-General Ashburn presented a defense for inland waterways, outlining the history and progress of the government venture. The inland waterways, he said, have no desire to deprive participating rail or motor carriers of a fair share of the accruing revenue for joint service performed and where there is a comparable rail route, or a motor route to a rail-water, or motor-water route, the waterways are willing to give the participating rail or motor carrier the same revenue that it would receive from its connecting rail or motor route. Where there is no comparable land route, each participating carrier should get a fair share of the resultant revenue, such share bearing some fair relation to the cost of the service performed. He also stated that the waterways' conception of the proper method of dividing the accruing revenue is a first-class rate-pro-rate.

"It seems to me," he continued, "that most of the public discussions have referred too much to competition between the various forms of transportation, their rights, the effect of such competition upon the revenues of the carriers, and far too little upon the rights of the public to get that form of transportation which is of most value to them. Whatever we may say to the contrary, each form of transportation has been subsidized, is subsidized and will continue to be subsidized if the public so wishes; and rest assured, my friends, that the public does so wish."

Major-General Ashburn also offered for consideration a plan whereby the participating lines would apply the total actual cost of the movement, or the sum of the separate costs to the carriers as a great common denominator, in determining the fraction of the joint revenue to which each carrier is entitled.

"For example, he said, suppose the Illinois Central carried freight 700 miles to St. Louis, Mo., and the barge lines carried it 1,200 miles from St. Louis to Baton Rouge, La., and the Texas & Pacific 500 miles from Baton Rouge to Fort Worth, Tex. Furthermore, for the purpose of illustration, let us suppose that the

cost per ton-mile of the I. C. was 10 mills and the cost per ton-mile of barge service 5 mills, and the cost of the T. & P. 12 mills. Then the share of the total joint revenue to which the Illinois Central would be entitled would be 700 times 10 mills or 7,000 mills; the share of the joint revenue to which the barge line would be entitled would be 1,200 times 5 mills or 6,000 mills; and the share of joint revenue to which the Texas & Pacific would be entitled would be 500 times 12 mills or 6,000 mills. Since the total cost of this movement would be 19,000 mills, the I. C. would be entitled to 7/19 of the joint revenue, the barge line to 6/19 and the T. & P. to 6/19 of the joint revenue.

"Under this system, each carrier would be entitled to a just return for its services and each rail carrier would receive exactly the same treatment from the barge line. Of course, the cost per ton-mile not only varies between localities but varies for the same railroad from year to year. Accordingly, it would be perhaps advisable to have these divisions changed yearly, the basis for such division being determined by the yearly report of the carriers to the Interstate Commerce Commission. Such a plan, by recognizing the difference in cost per ton-mile of carriers operating in different localities, seems to be fair; and ought to be profitable to all concerned. It is offered merely for consideration."

#### Day Attacks Railway Executives' Policy

Mr. Day attacked the declaration of policy issued by the Association of Railway Executives on November 20, 1930, and endeavored to show that changing business practices have forced shippers to seek more efficient and economical transportation and that there is need for modernizing railway plants if railways desire to keep pace with the march of progress. In his discussion he said that if the 1921 rate structure had remained intact throughout the past decade, instead of being cut here and there, "the carriers would have suffered a substantial loss in revenue rather than the further gain they picture, because the traffic would not have moved to the extent that it did."

His comments on water transportation included the following statement: "In my opinion there is no real public demand for legislation regulating port to port water transportation as the carriers propose, and many shippers believe that the inevitable result thereof would be to unduly inflate port to port rates to the detriment of the public at large." His remarks on highway transportation included the citation of figures to show that highway vehicles are adequately taxed and that the expenditures of the government on highway construction and maintenance from general taxation has been more than compensated for by the excise tax on motor vehicles. He also stated that the motor truck has become an essential part of our business life and that it would be a step backward to surround it with legislative restrictions that will unnecessarily retard its usefulness. "I realize," he continued, "that the motor truck is rapidly growing in popularity with the carload shipper, as well as the less carload shipper, to the detriment of the railroads. I also appreciate the influences that have contributed toward this change and, I repeat here what I have several times said to railroad officers, that if, as is apparent, the trucks afford a more economical and efficient service than they are able to give, they owe it to themselves as sellers of transportation, as well as to the public that they serve, to engage actively in the trucking business."

"One of the problems confronting the railroads, is their terminal costs of handling less carload freight.



It has long been contended by railroad officers that such traffic is unprofitable and I assume this situation has been aggravated by general business conditions and competitive forms of transportation. In other words, certain facilities must be maintained and, as the volume of less carload decreases, handling costs necessarily increase. If, as many railroad executives agree, any further increases of less carload freight rates will simply make a bad situation worse, it seems necessary for the railroads to turn to their present methods of handling such traffic for a solution of their problem and I suggest that they explore thoroughly the possibilities of co-ordinated rail and truck transportation, both from the standpoint of speeding up their service and cutting down their overhead.

"If, perchance, some railroads are not disposed to enter the trucking business, I suggest for their consideration the possibilities of joint rates with independent trucking companies. Such a plan would permit store door pickup and delivery service and, through substitution of the truck for rail service to and from main line concentration points, substantial economies might be effected and, at the same time, service would be materially improved. Presumably, federal legislation would be necessary to bring about such arrangements, but this should not prove to be an unsurmountable obstacle if all parties of interest whole-heartedly co-operate."

#### Ship Owners Oppose Regulation

According to Mr. Walker, the American Steamship Owners' Association opposes regulation of strictly port-to-port shipping by the Interstate Commerce Commission because it believes that the shipping business can be more efficiently carried on under conditions which leave the carriers greater freedom of action than would be possible under increased governmental control and regulation.

"Once the jurisdiction of the Interstate Commerce Commission was extended along the lines suggested by the railway executives," he said, "the same governmental supervision would necessarily be imposed upon the water carriers as has been done with the railroads. If Congress should grant such authority and impose upon the Interstate Commerce Commission the duty of exercising it, the Interstate Commerce Commission could do no less than take over the minute control and supervision of the water carriers."

"We believe that the fundamental reason which moves the railway executives to advocate putting the water carriers under the Interstate Commerce Commission is the natural resentment against their own burdensome regulations and an apparent belief that they cannot be changed and relief obtained. Observing the freedom of action under which the shipping business is carried on, and noting the development of the water carriers as the result of such freedom, the railway executives would place upon competitive shipping business similar hampering regulations and control. Instead of endeavoring to restrain the development of shipping, a wiser course would be to seek relief through the relaxation of over-regulation and control."

"If we may offer the railroads a suggestion, it is that they direct their efforts toward educating the public and Congress on the evils of over-regulation and endeavor to secure greater freedom of action. The railroads should examine the provisions of the Shipping Act, 1916, for they may find therein a precedent for the character of relief and reasonable control which will lift the burden of regulations and yet afford all necessary public protection."

## B. & M.-New Haven Merger Recommended

**C**ONSOLIDATION of the New York, New Haven & Hartford and the Boston & Maine, after these two roads have been "freed from the present excess ownership of their stocks by the Pennsylvania" is recommended in the majority report of the New England Railroad Committee submitted to the governors of the six New England states on May 7. A minority report submitted by the Rhode Island members and the reservation of two Massachusetts members, however, reveal three points of view in connection with the recommendations which the committee was assigned to evolve "for a policy with respect to consolidation and ownership" of New England railroads.

The majority report recommends that the existing status be preserved with respect to the interest of the New York Central in the Boston & Albany, the Canadian National's control of the Central Vermont and other C.N.R. and C.P.R. lines in New England. Also, because of wage differentials, and other factors, the adjustment of which would tend to neutralize possible economies attending the inclusion of the Maine Central and Bangor & Aroostook, the continuance of the existing status of these Maine roads is likewise recommended. In connection with the proposed New Haven-Boston & Maine system the majority would limit the Pennsylvania interest therein to 10 per cent. A course of procedure designed to induce the Pennsylvania to conform to this latter is suggested. In concluding its discussion the report emphasizes that the course of action recommended "is based upon the practicalities of the present situation. The future must demonstrate what additional steps should be taken."

The Rhode Island members favor a parceling of the New England roads among the trunk lines. Like the majority, they would maintain the existing status with respect to the New England interests of the New York Central and the Canadian lines. The New Haven, under the Rhode Island proposal, would be amalgamated with the Pennsylvania and the Boston & Maine would be merged into the Chesapeake & Ohio-Nickel Plate system; the Rouses Point-Ogdensburg line of the Rutland would be allocated jointly to the New York Central and the Chesapeake & Ohio-Nickel Plate and the so-called bridge lines would be allocated between or among the New York Central, the Pennsylvania, and the Chesapeake & Ohio-Nickel Plate.

In their reservation, James L. Richards and Charles H. Jones, Massachusetts members, set forth that, in joining with the majority in its conclusion favoring the consolidation of the New Haven and the Boston & Maine, they "do not believe the present ownership of the Pennsylvania Railroad in the securities of the New Haven and Boston & Maine is excessive, and we believe that any effort to reduce it by threat or coercion will be distinctly injurious to New England railroad securities and will tend to check improvement and impair existing service."

The program of action recommended to the New England governors in the majority report follows:

1. That the Governors petition the Interstate Commerce Commission for the right to intervene in the Four-Party plan proceedings, on the grounds that the plan as proposed modifies the Commission's complete plan in respect to its treatment of New England and because it is vital to New England that the future status of the New England roads

(Continued on page 983)

# Railway Purchases and Inventories

## Lower in 1930\*

Nation's biggest buyer spent \$300,000,000 less in supply markets—but aggregate still large

**R**AILWAY men, the railway supply industry and the public have had reason to expect, from the depressed condition of business and the estimates and fragmentary statistical information appearing in the past six months, that expenditures made by the railways of the United States for materials and supplies were lower in 1930 than in previous years, but the extent of the reductions has not been settled. Compilations made by the *Railway Age* from special reports received from the carriers on the value of materials purchased and used show that the direct expenditures made by the Class I railroads of the United States for materials and supplies amounted to \$1,038,000,000 in 1930, compared with \$1,392,535,000 in 1929, a reduction of \$291,035,000, or 21½ per cent. These figures represent the direct purchases and exclude large purchases made indirectly through lump-sum contracts with builders of bridges, terminals and other work.

The railways effected a reduction of \$37,797,298 in the value of materials and supplies on hand at the end of 1930, as compared with 1929. According to additional reports received from the carriers, purchases made by the railways in January, February and March, 1931, were lower than purchases made in the corresponding months of 1931 but were inclined upward.

The reductions in railway purchases in 1931 reflect in part the economies resulting from greater efficiency of the railway plant (particularly noteworthy in the utilization of fuel) and substantial declines in material prices, but, for the most part, have resulted from the lower consumption of materials attendant upon business depression and the corresponding shrinkage in railway business. The loss of business which the railways have experienced from competing forms of transportation has also been a factor.

### Reductions General

Reductions in the use of material during 1930 were general. On 10 of 79 roads, for which comparative fuel consumption statistics are available, the reduction in fuel consumption was under 10 per cent. It was from 10 to 20 per cent less on 35 of these roads and from 20 to 30 per cent less on 34 roads. The consumption of rails was higher on a few roads than it was in 1929, but the instances were rare. The reduction in consumption was under 10 per cent on 15 of 59 roads reporting comparable figures, but the consumption was between 10 and 20 per cent less on 9 roads, between 20 and 50 per cent less on 22 roads, and over 50 per cent less on 13 of these roads. Of 60 roads reporting comparable statistics on tie consumption, only 8 showed reductions of 10 per cent or under, while the consumption was from 10 to 20 per cent less on 18 roads and over 20 per cent on 34 roads. Of 67 roads reporting comparable figures on consumption of miscellaneous materials, 12 showed reductions of 10 per cent or under;

24, reductions of from 10 to 20 per cent; and 31 showed reductions of over 20 per cent.

### Purchases Downward All Year

A chart has been prepared to show the trend of rail purchases, by months, since the beginning of 1929. This chart, with the exception of that portion relating to purchases in 1931, was developed from special reports received from railroads making about 60 per cent of the railway purchases. The trends during 1929 were generally marked by the continuity of railway purchasing, which is representative of the normal trend of railway expenditures for materials and supplies. Beginning with January, 1930, however, railway purchases show an almost unbroken decline all year, reductions from the purchases made in corresponding months of the previous year growing larger with each successive month. They were 7½ per cent lower in March, 1930, than in March, 1929, 15 per cent lower in May, 18 per cent lower in June, 20 per cent lower in July, 31 per cent lower in August, 36 per cent lower in September, 48 per cent lower in October, and 43 per cent lower in November,

Table I—Unapplied Material on Class I Railways—1916 to 1930, Incl.

Year	Stocks on Hand End of Year	Decrease from Previous Year
1916	\$323,556,387	\$.....
1917	502,986,042	+179,429,655
1918	630,207,210	+127,221,168
1919	597,573,735	-35,633,475
1920	755,563,278	+157,989,543
1921	665,147,099	-90,416,179
1922	546,284,858	-118,862,246
1923	682,725,812	+136,440,959
1924	560,048,899	-122,676,913
1925	525,853,107	-34,195,792
1926	551,694,794	+25,841,689
1927	523,650,986	-28,043,808
1928	471,077,760	-52,573,226
1929	470,072,929	-995,169
1929*	468,586,510	.....
1930*	430,789,212	-37,797,298

\* Total for roads reported in Table II in both 1929 and 1930, excluding switching companies.

NOTE: The plus sign (+) opposite figures in third column signifies an increase.

while the purchases in December, 1930, when purchases normally are heavy, were 47 per cent less than the purchases in December, 1929.

### Railway Expenditures Still Large

While the aggregate purchases made directly by the railways in 1930 for materials and supplies were the lowest in many years, the expenditures were still large. In one of the tables, the purchases are divided to show the approximate expenditure for 30 classes of material, compared with the corresponding figures for previous years. The expenditures for the subordinate classes of material were estimated on the basis of the average percentage which the smaller expenditures bore to the group expenditures during the past three years and a consideration of special statistics or other factors. The statistics represent the value of invoices paid and the materials delivered rather than the value of orders

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placed, a noteworthy fact in connection with expenditures for rail, which represent, in part, rail ordered in the previous year.

The table shows that Class I railways expended \$306,500,000 for fuel, including \$242,100,000 for bituminous coal and \$53,600,000 for fuel oil. They expended \$134,600,000 for forest products, including approximately \$75,000,000 for crossties and \$43,000,000 for timber and lumber. In spite of a reduction of more than \$100,000,000 for iron and steel products, the railways expended approximately \$329,000,000 in this field of purchasing last year, including approximately \$75,000,000 for rail and \$53,000,000 for track material, while some \$267,000,000 were spent for miscellaneous materials, including \$18,000,000 for lubricants, and \$20,000,000 each for stationery and commissary supplies.

Considering both direct and indirect purchases, the

of purchases by the railways than were made in 1930 but the purchases show an upward trend and suggest that the low point of railway purchasing of the present period may have been passed in 1930.

## Inventories Lowest Since 1916

The capital which the Class I railroads of the United States had tied up in unapplied material and supplies at the close of 1930 amounted to \$430,789,212 a reduction of \$37,797,298 or 8.5 per cent from the corresponding figures for 1929, according to an analysis which has been made by the *Railway Age* of the reports filed by the carriers with the Interstate Commerce Commission. This reduction will be interpreted by railway supply officers as an accomplishment, in view of the

Table A—Purchases of Materials and Supplies by Class I Roads of the United States—1930

Item	1930	1929	1928	Reduction 1930-1929	Per Cent of Total
<b>Fuel:</b>					
Bituminous coal .....	\$242,100,000	\$287,999,000	\$301,935,000	\$46,000,000	23.21
Antiracite coal .....	6,950,000	8,372,000	10,261,000	1,422,000	.67
Fuel oil .....	53,600,000	62,132,000	67,051,000	8,532,000	5.25
All other .....	3,850,000	5,889,000	5,361,000	1,039,000	.37
<b>Total fuel .....</b>	<b>\$306,500,000</b>	<b>\$364,392,000</b>	<b>\$384,608,000</b>	<b>\$57,892,000</b>	<b>29.50</b>
<b>Forest Products:</b>					
Cross ties (treated and untreated) .....	\$75,500,000	\$83,421,000	\$95,684,000	\$7,921,000	7.25
Switch and bridge ties (treated and untreated) .....	9,150,000	10,642,000	9,376,000	1,492,000	.88
Timber and lumber .....	43,550,000	55,002,000	49,598,000	11,492,000	4.18
Other forest products .....	6,400,000	8,486,000	6,136,000	2,086,000	.61
<b>Total forest products .....</b>	<b>\$134,600,000</b>	<b>\$157,551,000</b>	<b>\$160,794,000</b>	<b>\$22,951,000</b>	<b>12.92</b>
<b>Iron and Steel Products:</b>					
Steel rail (new and second-hand, except scrap) .....	\$75,000,000	\$94,195,000	\$92,181,000	\$14,195,000	7.70
Wheels, axles and tires .....	32,700,000	41,269,000	39,727,000	8,569,000	3.15
Frogs, switches, crossings, track fastenings and bolts, spikes, tie plates, rail anchors, etc. ....	53,700,000	70,971,000	67,376,000	17,271,000	5.15
Iron bridges, turntables, structural steel, bar iron and steel, forgings, fabricated and unfabricated shapes, and pressed steel parts .....	39,200,000	57,330,000	45,001,000	18,130,000	3.75
Flues and tubes for locomotives and stationary boilers .....	6,200,000	7,194,000	8,714,000	994,000	.60
Telegraph and telephone, interlocking and signal material .....	25,000,000	30,878,000	22,969,000	10,878,000	1.93
Bolts, nuts, washers, rivets, springs, etc. ....	14,800,000	20,272,000	18,446,000	5,472,000	1.42
Locomotive and car castings, beams, couplers, frames and car roofs .....	49,500,000	65,086,000	59,647,000	17,586,000	4.75
Machinery, boilers, repair parts and all other iron and steel products .....	35,600,000	50,645,000	43,483,000	15,045,000	3.45
<b>Total iron and steel products .....</b>	<b>\$329,700,000</b>	<b>\$437,840,000</b>	<b>\$397,544,000</b>	<b>\$108,140,000</b>	<b>31.95</b>
<b>Miscellaneous:</b>					
Cement .....	\$5,100,000	\$7,628,000	\$6,300,000	\$2,528,000	.49
Lubricating oils and grease; illuminating oils, boiler compound; waste ..	18,200,000	24,328,000	23,968,000	6,128,000	1.75
Metals and metal products .....	41,500,000	59,497,000	49,826,000	17,997,000	4.00
Ballast .....	18,500,000	23,750,000	23,749,000	5,250,000	1.78
Air brake material and appliances for locomotives .....	18,000,000	25,043,000	22,112,000	7,043,000	1.73
All electrical materials .....	14,700,000	17,641,000	18,400,000	2,941,000	1.42
Stationery and printing .....	20,300,000	25,567,000	25,638,000	5,300,000	1.94
Commissary supplies for dining cars and restaurants .....	21,500,000	28,899,000	26,055,000	7,400,000	2.06
Rubber and leather goods .....	7,500,000	9,637,000	9,521,000	2,157,000	.72
Painters' supplies and chemicals .....	26,800,000	35,985,000	33,794,000	9,185,000	2.58
Automotive equipment and supplies .....	1,600,000	2,545,000	2,031,000	945,000	.15
Train and station supplies and all other miscellaneous purchases .....	74,000,000	111,212,000	87,001,000	37,212,000	7.10
<b>Total miscellaneous .....</b>	<b>\$267,700,000</b>	<b>\$369,752,000</b>	<b>\$328,395,000</b>	<b>\$102,052,000</b>	<b>25.52</b>
<b>Grand Total .....</b>	<b>\$1,038,500,000</b>	<b>\$1,329,535,000</b>	<b>\$1,271,341,000</b>	<b>\$291,035,000</b>	<b>100.00</b>

Note: All prices include freight and handling charges.

1930 figures estimated from special reports to *Railway Age*. Values for 1929 and 1928 are Bureau of Railway Economics figures.

railways continued throughout 1930 to maintain their position as the largest consumer of coal mined in the country, a purchaser of over 20 per cent of the country's timber cut, and, in view of the depression experienced last year by the automobile industry, the railways again regained their position as the largest consumer of iron and steel products.

### Upturn This Year

Statistics received thus far for the first three months of 1931 are still too fragmentary to determine definitely the trend of purchases during this year, but, they invite attention. During January, February and March, 1931, total railway purchases, based on 25 per cent of the railroads' buying power, showed reductions from the purchases made in the corresponding months of 1930. Considered in the light of car-loading trends and other business factors, they offer no hope for a larger volume

difficulty in controlling stocks during 1930, the uncertainty of anticipating requirements for material, and also because of the drastic curtailment made in forces employed in handling supplies and the difficulties which depressed consumption throws in the way of disposing of surpluses.

The aggregate reduction in inventories reflects a continued trend downward in the volume of unapplied materials and supplies since 1920. This trend downward is both absolute and relative. It represents a reduction of approximately \$325,000,000 in the value of materials carried since 1920 and also represents a noteworthy reduction in terms of the railway business to be protected, as reflected by the amount of material carried in stock for each 1,000 car-miles. The reductions are shown in one of the charts.

An analysis of the reports shows that 89 roads effected reductions in their stocks of unapplied materials, aggre-



gating approximately \$42,000,000, but these reductions were offset by increases on 33 roads in the approximate amount of \$15,000,000. Reports received by the *Railway Age* from the roads are incomplete for all classes of material, but they show that total inventories included at least \$29,725,720 for fuel, \$81,870,476 for ties, \$38,063,930 for rail, \$2,768,444 for commissary materials, \$1,939,791 for stationery, \$193,767,514 for storehouse and miscellaneous material. Based on the consumption during the previous 12 months, the year 1930 ended with a 10.9 months' supply of ties, a 4.9 months' supply of rail, a 45 days' supply of commissary materials, a 38 days' supply of stationery, a 3.8 months' supply of miscellaneous materials, and a 3.8 months' supply of total materials.

The book value of total stocks on hand on Class I Railways at the close of each year since 1916, are given in Table I. In this table, the inventories shown for each year up to 1929, inclusive, are the totals published in the annual reports of the Interstate Commerce Commission, while the subsequent figures are those compiled by the *Railway Age* from the annual reports filed with, but not yet published, by the Interstate Commerce Commission, or from reports received direct from carriers.

#### Turnover Figures

Table II gives the total book value of supplies which each road has filed with the Interstate Commerce Commission as of the close of 1930, together with the increase or decrease over the corresponding statements

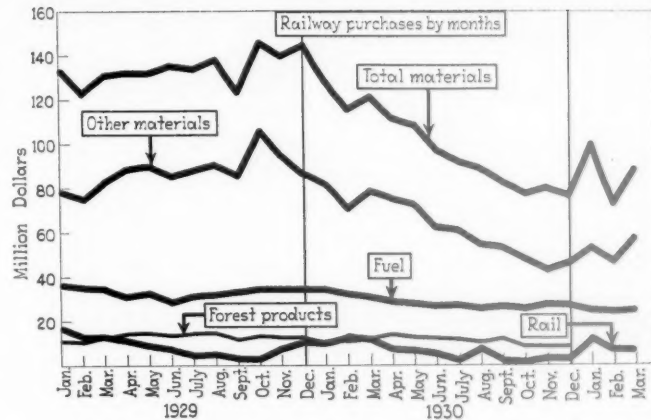


Chart Showing Trends of Railway Purchases by Months

in their total stock as compared with that reported at the close of the previous year to the Interstate Commerce Commission and a comparable number of roads show reductions in excess of 10 per cent. The largest reduction was \$5,284,398 or 13.7 per cent reported by the Pennsylvania, while other roads showing large book value reductions comprised the New York Central, with a reduction of \$2,980,870 or 5 per cent; the Great Northern, with a reduction of \$2,264,977, or 20.3 per cent; the Baltimore & Ohio, \$2,907,696, or 16.1 per cent; the Reading, \$1,895,719, or 21 per cent; the Texas & Pacific, \$1,586,348, or 26.1 per cent; the Union Pacific,

Table B—Purchases of Fuel, Materials and Supplies by Class I Railways of the United States—1923 to 1930

Item	1930	1929	1928	1927	1926	1925	1924	1923
Fuel .....	\$306,500,000	\$364,392,000	\$384,608,000	\$438,821,000	\$473,354,000	\$459,465,000	\$471,656,000	\$617,800,000
Forest Products .....	134,600,000	157,551,000	160,794,000	175,729,000	186,291,000	170,305,000	180,872,000	232,511,000
Iron and Steel Products ..	329,700,000	437,840,000	397,544,000	432,604,000	507,302,000	419,255,000	365,610,000	464,955,000
Miscellaneous .....	267,700,000	369,752,000	328,395,000	348,774,000	392,085,000	343,018,000	324,917,000	423,437,000
Grand Total .....	\$1,038,500,000	\$1,329,535,000	\$1,271,341,000	\$1,395,928,000	\$1,559,032,000	\$1,392,043,000	\$1,343,055,000	\$1,738,703,000

filed a year previous. The table also shows the percentage reduction or increase in each road's inventory and the percentage which each road's inventory was of its annual operating expenses. The table also shows the materials of different classes on hand and used during 1930, as they have been reported by the individual carriers to the *Railway Age*, and affords a comparison of these statements on the basis of the days' or months' supply on hand. Table III gives the figures for roads not furnishing classified reports.

In presenting the figures relating to the quantities of fuel, ties, rail and other materials on hand and used, the *Railway Age* recognizes the impracticability of reducing the figures on all roads to an absolutely uniform basis by reason of the lack of a complete uniformity with which different railways keep their books. It, therefore, makes no claim for the classified reports of materials on hand nor for the figures on consumption other than that they are published substantially as received in reply to its questionnaires. To promote uniformity, however, the railroads were asked to report as on hand, all new, second-hand, shop-made and otherwise usable material, machinery and equipment available and unapplied, including ties at treating plants, line stocks, working stock and supplies for A. F. E. and materials received but not paid for, and to exclude scrap, retirements and stores expense. They were requested to report as used the book value of all materials, less ballast, scrap and stores expense issued to closed accounts and to explain any substantial deviations from this outline.

Thirteen roads show reductions of \$1,000,000 or more

\$1,001,467, or 5.5 per cent; the Chicago, Milwaukee, St. Paul & Pacific, \$1,374,624, or 9.9 per cent; and the Boston & Maine, \$1,251,913, or 17.7 per cent. The reports show an increase of \$2,338,867, or 9 per cent, on the Southern Pacific—Pacific lines; \$646,524, or 4.3 per cent, on the Elgin, Joliet & Eastern; \$241,656, or

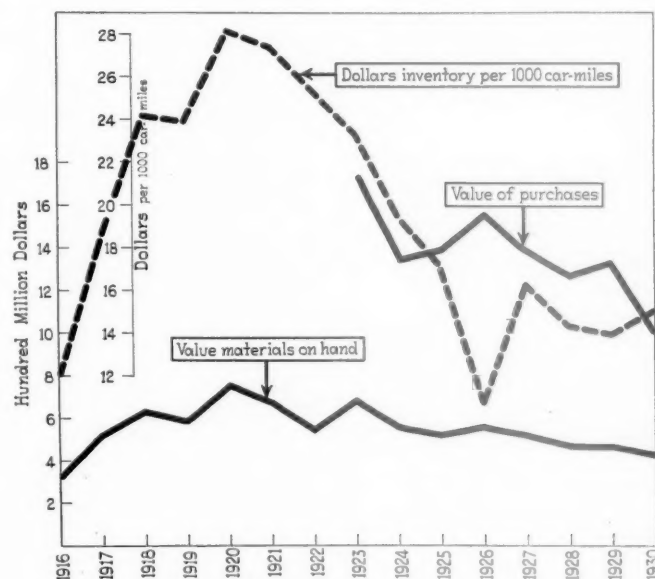


Chart Showing Trend of Annual Purchases and Year-End Inventories of Class I Railroads, Also Relation of Inventory to Car Mileage

Table II—Materials and Supplies Used

Railroad	Steam Fuel			Cross Ties			Rail			Commissary		
	On Hand Dec. 31 1930	Used 1930	Days' Supply	On Hand Dec. 31 1930	Used 1930	Months' Supply	On Hand Dec. 31 1930	Used 1930	Months' Supply	On Hand Dec. 31 1930	Used 1930	Days' Supply
Akron, Canton & Youngstown	\$1,061	\$105,929	3	\$45,139	\$92,412	5.9	\$8,989	\$13,322	8.1			
Ann Arbor	13,012	486,574	10	200,328	114,062	21.0	42,962	31,823	16.2	1,560	46,849	12
A. T. & S. F. Lines	3,408,135	17,633,267	70	8,379,524	5,575,285	18.0	4,417,939	6,554,355	8.1			
Atlanta & West Point Lines	10,728	301,105	12	191,030	115,941	20.0	28,229	37,303	9.1			
Atlanta, Birmingham & Coast	26,296	294,161	32	182,067	232,629	9.5	29,412	22,647	15.5	12,702	157,803	30
Atlantic Coast Line	800,508	4,012,105	7	1,610,565	1,544,461	12.5	1,510,414	2,783,512	6.5	37,733	754,991	18
Baltimore & Ohio	215,481	9,034,602	9	4,101,256	6,686,517	7.4	1,690,125	5,693,527	3.5	185,736	1,622,370	42
Bangor & Aroostook	161,355	547,213	102	150,526	187,583	9.6	47,180	190,277	2.9	757	31,640	10
Belt Railway of Chicago	42,623	757,673	2	108,030	101,369	12.8	39,177	121,727	3.8			
Bingham & Garfield	943	25,872	13	30,470	42,752	8.6	41,106	39,028	12.5			
Boston & Albany	122,223	2,756,242	16	434,958	530,921	9.8	89,714	512,544	2.1	32,954	331,379	36
Boston & Maine	125,862	5,064,618	9	1,408,706	1,603,607	10.5	307,703	1,334,659	2.7	21,998	314,340	24
Buffalo & Susquehanna	2,582	98,411	10	16,930	99,414	2.2	5,158	6,311	9.8			
Buffalo, Roch. & Pittsburgh	17,475	914,611	7	123,632	213,664	7.0	120,696	171,212	8.4	1,622	15,873	42
Burlington-Rock Island	73,377	133,741	200	96,851	142,755	8.2	600,249	798,751	9.1			
Central of Georgia	48,046	1,315,008	13	327,332	336,226	11.6	258,308	260,602	11.8	523	14,055	15
Central of New Jersey	125,028	4,006,780	11	501,289	358,356	17.0	177,973	949,489	2.2	2,563	114,607	6
Central Vermont	12,789	736,585	6	140,285	287,746	5.9	291,618	113,454	30.1	1,993	575	30
Chesapeake & Ohio	117,351	4,417,623	10	755,432	1,443,414	6.2	219,784	3,852,413	0.7	34,060	205,766	60
Chicago & Alton	38,929	1,602,972	11	244,974	522,479	5.6	202,100	554,751	4.4	14,386	129,739	42
Chicago & Eastern Illinois	52,562	1,243,702	15	365,703	275,694	16.0	173,001	292,215	7.1	9,150	71,996	45
Chicago & Illinois Midland	951	131,988	3	18,721	84,864	2.7	2,005	11,068	2.1			
Chicago & North Western	543,674	7,584,992	26	3,999,637	2,745,152	17.0	1,510,305	3,138,541	5.7	42,372	608,054	24
Chicago, Burlington & Quincy	406,841	8,336,495	18	4,141,847	2,865,230	17.0	1,463,151	3,604,917	4.9	119,797	640,359	66
Chicago Great Western	45,384	1,909,059	9	17,770	587,932	0.4	82,264	520,339	1.9	6,592	116,858	21
Chicago, Indian. & Louisville	13,447	646,288	8	167,453	200,281	9.5	195,653	372,657	6.3	7,729	155,197	18
Chicago, Mil. St. P. & P.	504,939	8,989,806	20	3,611,166	3,860,475	11.2	1,355,596	2,868,098	5.7	109,107	429,104	93
Chicago, R. I. & P. Lines	577,201	8,345,589	25	2,035,352	1,974,639	12.5	474,656	2,332,593	2.4	141,700	768,956	66
Chicago, St. P., Minn. & O.	107,025	2,440,264	16	569,659	618,977	11.0	253,461	925,124	3.3	5,860	98,857	21
Clinchfield	4,551	241,080	7	143,047	246,353	7.0	144,731	77,883	24.0			
Colorado & Southern	43,553	714,668	22	117,929	201,643	7.0	301,539	291,102	12.4	3,025	53,665	21
Columbus & Greenville	2,304	99,858	9	1,527	103,649	0.2	5,698	5,626	12.0			
Delaware & Hudson	663,227	2,703,823	89	267,025	843,636	3.8	245,329	931,750	3.1	8,173	38,171	70
Del., Lack. & Western	150,802	5,675,472	10	472,920	462,474	12.2	164,021	978,402	2.0	39,538	340,404	42
Denver & Rio Grande West.	61,611	1,638,179	14	489,929	945,190	6.2	501,198	189,678	32.0	17,019	337,777	18
Detroit & Mackinac	6,659			32,997			15,554			395		
Detroit & Toledo Shore Line	7,934	148,477	19	29,677	46,584	7.7	9,528	144,891	0.8			
Detroit, Toledo & Ironton	5,179	355,352	5	232,517	164,906	17.0	109,216	37,176	35.0			
Elgin, Joliet & Eastern	31,390	1,056,352	11	140,850	673,948	2.6	131,345	754,275	2.1	11	627	6
Erie System	256,759	8,279,724	11	2,383,333	2,921,991	9.8	389,825	3,891,144	1.2	44,664	442,434	36
Florida East Coast	246,413	888,741	102	30,005	63,138	5.7	217,332	18,559		752	6,218	45
Fort Smith & Western	2,477	106,911	8	4,194	49,426	1.0	8,264	426	233.0			
Fort Worth & Denver City	94,044	687,918	50	22,456	214,381	1.2	199,661	197,535	12.2			
Georgia	17,352	424,610	15	90,914	169,312	6.5	15,373	23,703	7.8			
Georgia & Florida	7,817	153,390	19	19,962	89,844	2.6	1,828	13,578	1.6	2,788	25,835	36
Grand Trunk Western	242,966	2,021,337	44	377,587	677,291	6.7	179,634	479,632	4.5	8,023	198,893	15
Great Northern	823,170	8,502,932	35	1,768,301	2,419,016	8.7	616,465	1,419,761	5.2	106,981	1,134,798	33
Green Bay & Western	28,097	202,520	50	80,719	91,739	10.5	146,072	93,515	18.7			
Gulf Coast Lines	217,336	864,861	91	375,423	892,232	5.1	164,965	361,273	5.5	10,208	76,404	
Gulf, Mobile & Northern	11,940	280,397	15	100,294	161,122	7.5	96,781	252,348	4.6	1,605	2,104	
Illinois Central System	356,890	9,386,583	12	1,373,529	2,545,468	6.5	1,148,051	2,187,850	6.3	47,738	664,261	27
Indiana Harbor Belt	16,125	1,065,945	6	115,782	148,114	9.4	15,126	180,805	1.0			
International-Great Northern	248,357	1,309,612	69	577,036	606,467	11.3	217,050	211,914	12.3			
Kansas City Southern	340,804			479,239			220,773			674		
Lake Superior & Ishpeming	47,481	97,038	175	34,372	55,832	7.4	55,958	57,293	11.5			
Lehigh & New England	35,094	322,275	39	90,656	78,947	13.8	42,609	162,834				
Lehigh Valley	213,639	4,796,450	16	540,682	458,661		444,228	1,848,024	3.1	79,433	177,626	159
Long Island	54,022	1,032,488	19	86,970	354,844	1.8	101,184	201,822	6.0			
Louisiana, Arkansas & Texas	242	66,211	2		81,210			4,048				
Louisville & Nashville	337,521	5,783,037	21	3,264,141	2,542,997	15.5	1,150,240	1,824,215	7.5	80,905	188,535	157
Maine Central	56,943	1,503,763	14	367,790	430,276	10.1	96,024	100,262	11.2			
Minneapolis & St. Louis	53,473	841,853	23	279,508	258,096	13.0	87,525	87,416	12.0			
Minn., St. P. & S. S. Marie	209,817	2,993,712	25	695,475	1,426,483	5.7	365,271	242,363	18.0	16,682	119,687	51
Mississippi Central	3,752	60,394	22	4,121	47,050	1.5	26,142	14,043	22.2			
Missouri & North Arkansas	3,927	155,958	9	749	74,291	0.1	23,629	13,809	21.6			
Missouri-Kansas-Texas Lines	1,175,536	2,683,526	164	1,323,396	1,286,601	12.5	267,257	239,065	13.4	19,050	298,726	24
Missouri Pacific	629,000	6,673,100	23	340,951	2,298,608	1.8	788,221	2,771,077	3.4	43,739	1,246,139	126
Mobile & Ohio	27,766	824,211		32,595	489,320		79,575	226,090				
Nashville, Chat. & St. Louis	70,489	1,048,103	24	619,958	676,871	11.0	143,507	285,800	6.0	18,369	85,353	78
Nevada Northern	7,230	94,333	28	30,075	29,806	1.2	10,712	18,651	6.9	627	7,407	30
New Orleans Great Northern	789	123,709	2	82,388	70,405	14.0	45,400	109,365	5.0	628	1,488	153
New York, Chicago & St. L.	78,767	3,322,917	9	1,103,625	916,590	14.5	385,276	1,506,421	3.0			
New York, N. H. & H.	607,763	5,322,826	41	1,449,363	1,964,839	8.9	789,581	1,313,131	7.2	157,588	1,705,116	33
Norfolk Southern	17,719	446,648	14	69,319	305,944	2.7	60,925	50,667	14.2			
Northern Pacific	349,105	6,646,131	20	2,392,246	1,802,577	15.7	761,036	1,204,706	7.6	136,059	948,731	54
Northwestern Pacific	33,445	356,746	35	44,685	126,530	4.2	144,717	301,368	5.7			
Pennsylvania	712,957	25,615,207	10	9,586,092	7,151,832	16.1	869,033	9,749,957	1.1	244,066	2,671,175	33
Pere Marquette	381,859	2,988,018	47	990,418	1,040,019	11.4	304,149	1,502,049	2.4	3,433	123,450	9
Pittsburgh & Lake Erie	59,196	1,308,971	17	329,793	167,040	23.6	123,137	131,503	11.4			
Pittsburgh & Shawmut	1,958	72,309	10	754	38,470	0.2	24,049	8,958	32.2			
Pittsburgh & West Virginia	1,090	76,310	5	60,010	141,360	5.1	120,503	180,346	8.0			
Pittsburgh, Shawmut & North.		87,388		12,829	88,021	1.7	32,101	16,303	23.8			
Reading System	280,376	6,018,213	17	878,456	1,000,844	9.7	441,890	2,279,170	2.3	5,890	114,445	15
Richmond, Fred. & Potomac	100,685	784,711	49	74,465	196,355	4.3	46,802	466,287	1.2			
Rutland	78,668	468,601	61	130,551	222,854	7.3	93,945	56,995	19.8			
St. Louis-San Fran. Lines	333,189	5,354,514	23	1,313,938	1,665,219	9.5	387,209	435,337	10.6			
St. Louis Southwestern Lines	848,506	1,334,716	230	740,829	621,267	14.5	650,928	577,906	13.6	20,034	206,748	36
Seaboard Air Line	274,414	2,986,632	30	326,492	1,430,323	2.7	412,766	938,029	5.2	47,738	356,034	37
Southern System	266,607	8,039,659	12	1,549,681	4,358,521	4.2	790,237	2,309,177	4.1	70,497	686,186	51
Southern Pacific-Pacific Lines	8,850,057	14,348,844	225	2,905,414	3,234,869	10.8	3,626,698	5,478,023	7.9	297,109		



## Used and Carried by Class I Railroads in 1930

Stationery			Other Material—Less Scrap				Total				Ratio to Op. Exp.				
On Hand Dec. 31	Used 1930	Days Supply	On Hand Dec. 31	Used 1930	Mos. Supply	Used % Off 1929	On Hand Report to I. C. C.	Used 1930	Mos. Supply	Used % Off 1929	On Hand Decrease	Per Cent	1930	1929	
\$5,307	\$14,314	135	\$94,368	\$225,571	5.0	44	\$163,323	\$451,368	4.2	41	\$9,118	5.2	8.6	7.8	A. C. & Y.
3,050	14,319	78	290,156	372,796	9.4	35	555,453	1,066,425	4.0	28	14,725	2.6	14.4	12.4	Ann Arbor
86,595	1,093,503	29	12,625,517	36,223,231	4.2	15	29,097,945	67,079,643	5.1	15	633,438	2.1	18.2	16.7	A. T. & S. F.
10,005	52,046	70	428,744	557,075	9.2	36	679,899	1,063,472	7.5	22	95,669	12.3	16.5	16.1	A. & W. P.
6,461	52,138	45	250,396	724,590	4.2	3	539,949	1,483,971	4.1	8	55,577	9.4	12.3	12.8	A. B. & C.
238,615	1,375,775	63	2,707,737	7,955,029	4.2	+3	6,701,666	17,050,098	4.7	+11	+314,924	+4.9	13.5	11.9	A. C. L.
10,547	24,802	156	8,615,143	31,870,406	3.2	25	15,187,376	56,283,197	3.3	15	2,907,696	16.1	9.9	10.0	B. & O.
9,206	37,065	93	618,585	1,745,492	4.2	..	1,003,276	2,727,009	4.3	..	41,260	4.0	18.8	19.5	Bang. & Ar.
247	1,769	51	157,517	426,250	4.1	19	362,361	1,444,084	2.9	17	55,325	13.2	7.8	7.4	Belt of Chicago
7,843	151,795	19	53,119	53,140	12.0	..	126,559	164,061	9.2	..	71,722	36.2	39.2	52.0	B. & G.
1,693	6,390	97	1,053,048	3,485,022	3.6	20	1,758,212	7,768,105	2.7	16	+53,045	+31.1	8.0	7.7	B. & A.
20,882	62,039	122	3,954,778	9,501,172	5.0	11	5,819,049	17,818,398	3.9	14	1,251,913	17.7	11.4	11.9	B. & M.
9,202	28,415	117	105,638	198,666	9.6	58	136,239	408,595	3.9	51	139,645	50.5	9.2	13.3	B. & S.
16,727	291,399	21	1,148,261	3,161,464	4.2	20	1,468,325	4,565,872	3.8	17	18,454	1.2	11.5	10.2	B. R. & P.
30,986	113,639	100	231,600	630,455	4.4	..	1,041,036	1,734,120	7.1	..	+127,801	+14.0	41.1	33.6	B. R. I.
8,047	50,832	58	657,077	1,969,983	4.0	19	1,348,903	4,187,275	3.8	27	195,287	12.6	8.3	8.1	C. of Ga.
18,937	442,569	15	1,914,352	6,731,577	3.4	28	2,852,052	12,274,449	2.7	28	+111,576	+4.2	7.5	6.5	C. of N. J.
7,608	101,343	27	400,602	844,059	5.8	..	1,311,118	2,032,801	5.1	..	+740,826	+13.0	20.8	8.2	C. V.
10,935	106,887	37	3,085,670	16,300,507	2.3	5	4,303,863	26,662,294	1.9	1	+563,526	+15.0	4.9	4.4	C. & O.
9,030	24,666	134	4,289,526	16,300,507	1.6	13	1,193,848	6,969,729	1.9	11	101,748	7.8	5.8	5.8	C. & A.
50,826	845,410	22	583,114	2,265,192	3.1	31	1,222,376	4,255,689	3.4	37	9,635	0.8	5.6	6.3	C. & E. I.
32,647	937,413	13	173,147	610,952	3.3	+15	219,148	863,541	2.8	+10	22,128	9.2	9.1	10.2	C. & I.
10,257	91,792	41	4,896,538	21,016,960	2.7	1	11,091,876	35,939,112	3.7	10	592,754	5.1	11.0	10.1	C. & N. W.
10,816	68,904	57	26,804,478	3.1	22	..	14,151,593	43,188,894	3.7	19	434,122	3.0	14.3	13.0	C. B. & Q.
29,538	226,204	47	660,998	3,571,470	2.2	..	949,104	6,776,429	1.5	..	97,706	9.3	5.7	5.2	C. G. W.
30,589	519,365	21	625,020	1,708,650	4.3	47	1,063,016	3,151,977	3.9	30	125,728	10.5	8.9	9.2	C. I. & L.
18,934	130,167	53	6,536,542	18,278,227	4.3	12	12,550,887	34,651,916	4.2	25	1,374,624	9.9	11.2	10.8	C. M. St. P. & P.
10,350	14,210	265	4,893,328	14,439,470	4.0	38	8,326,173	28,380,615	3.5	32	515,134	5.8	9.2	8.2	C. R. I. & P.
15,449	34,146	165	1,025,840	3,169,888	3.9	4	2,034,296	7,383,277	3.2	7	22,168	10.7	11.8	9.3	C. St. P. M. & O.
6,536	14,055	170	398,774	636,991	7.5	..	736,393	1,216,519	7.0	..	+58,666	+8.6	18.5	15.6	Clinchfield
40,097	203,660	74	461,101	1,369,048	4.0	30	953,805	2,664,274	4.2	32	108,296	10.2	12.2	11.6	C. & S.
1,458	39,030	14	170,839	250,629	8.3	10	188,239	473,818	4.7	14	1,901	1.0	13.5	13.1	C. & H.
15,132	131,119	42	1,586,940	6,773,267	2.8	+6	2,849,830	11,494,309	2.9	4	869,796	23.4	9.2	11.5	D. & H.
3,893	..	..	1,603,950	8,761,266	2.2	17	2,466,458	16,257,048	1.8	17	449,080	15.4	4.7	5.0	D. L. & W.
3,978	11,771	122	2,017,815	..	..	..	3,121,278	..	..	..	190,367	5.9	15.2	13.5	D. & R. G. W.
12,139	32,844	135	160,475	223,090	5.0	47	149,697	574,813	31.0	41	52,239	26.0	7.4	7.0	D. & M.
16,911	63,717	97	359,411	713,182	6.0	..	724,257	1,303,462	6.5	..	38,201	5.0	11.8	9.4	D. T. & I.
21,437	368,446	21	1,791,536	3,164,990	6.8	+16	2,143,992	5,713,911	4.4	+11	+646,524	+43.5	13.8	8.7	E. J. & E.
18,748	47,335	145	2,397,911	13,388,078	2.1	20	5,405,419	29,291,819	2.3	15	251,419	4.5	6.1	5.5	Erie Lines
6,466	7,220	326	1,500,811	1,337,595	13.5	36	2,082,403	2,371,588	10.2	54	91,548	5.1	24.2	23.0	F. E. C.
12,600	44,462	103	131,025	182,567	8.7	..	152,428	346,553	5.2	..	+5,438	+3.7	13.7	11.7	F. S. & W.
10,004	54,777	69	467,055	1,949,917	2.9	30	803,334	3,233,879	2.9	27	139,556	14.8	12.0	11.9	F. W. & D. C.
4,118	12,000	125	446,335	797,336	6.8	11	588,309	1,469,740	4.8	20	88,976	13.1	14.7	17.4	Ga.
37,677	113,409	121	126,143	126,143	6.2	11	108,468	420,790	3.3	1	+4,577	+4.2	7.2	6.2	Ga. & Fla.
21,749	329,104	24	1,349,716	3,359,617	4.7	32	2,244,591	6,850,182	3.8	17	719,124	24.2	10.2	11.1	G. T. W.
..	..	..	58,996	71,072	9.9	73	9,558,068	..	..	..	2,464,977	20.3	13.2	14.5	G. N.
22,485	103,023	..	823,008	3,543,856	..	28	399,187	458,847	8.2	34	+6,144	+1.5	21.0	25.2	G. B. & W.
11,927	43,459	100	356,930	587,209	7.3	+18	592,346	1,326,643	5.2	+18	+105,405	+31.6	10.1	9.3	G. C. Lines
21,060	937,119	8	6,618,553	14,812,601	5.3	37	9,874,253	30,533,881	3.8	30	972,677	10.0	8.7	7.8	G. M. & N.
..	..	..	427,927	2,920,868	1.8	8	574,962	4,315,733	1.6	8	143,291	20.0	7.7	8.8	I. H. B.
1,224	69,331	54	1,360,487	4,626,087	3.5	..	2,441,706	6,823,414	4.2	..	477,044	16.1	19.0	20.2	I. G. W.
24,820	..	..	979,467	..	..	..	2,053,930	..	..	..	+29,579	+1.5	15.6	14.2	K. C. S.
6,556	46,314	52	163,517	265,214	7.4	11	307,328	419,547	8.6	25	+45,666	+17.5	22.4	16.7	L. S. & I.
27,707	272,870	36	205,722	496,517	5.0	+1	389,036	1,106,889	4.1	+3	21,312	5.1	10.2	10.9	L. N. & E.
..	..	..	2,593,128	7,678,687	4.0	28	4,074,172	15,232,321	3.1	20	212,750	5.0	8.5	8.0	L. V.
2,287	14,135	..	1,152,016	4,659,982	3.0	..	1,343,399	6,249,136	2.7	..	83,467	5.9	5.2	5.2	L. I.
99,160	630,425	57	85,865	..	..	..	136,441	251,471	..	..	11,350	8.4	14.5	14.3	L. A. & T.
8,456	60,657	54	5,643,766	9,670,441	7.0	..	10,968,109	20,639,650	6.1	..	1,134,484	9.4	11.8	11.5	L. & N.
37,037	191,618	71	1,120,088	1,916,154	7.0	..	1,640,847	3,950,457	5.0	..	210,349	11.4	12.4	12.3	Me. C.
6,334,5															



15 per cent, on the Western Maryland and \$255,557, or 5.8 per cent, on the Wabash.

### Comparisons of Roads

The ratio which each road's total book value of materials and supplies bears to its annual operating expenses is not universally accepted as a basis of measuring railway supply operations. It is believed by some that this measure is not sound for reason that the stocks include materials not chargeable to operating expenses, as well as those chargeable to operating expenses. It is also contended that the ratio is likely to be unfair because of the different physical and operating conditions of the carriers and the distances from sources of supplies, and unfair to the departments, which, while charged with the custody of material, do not control the operating expenditures which may be arbitrarily increased or decreased from causes not associated with material. Within reasonable limits, however, the material which a railroad uses and carries bears a close relationship to the expenses of operation. The index, moreover, has the virtue of reflecting official corporation statements and is also the only single index available for all railroads.

### Leading Roads

The compilations show that the materials and supplies reported by the railroads last year ranged from 4.1 per

Table III—Materials and Supplies, Other Class I Roads

Road	Total On Hand 1930	Reduction from 1929	Per Cent Red.	Ratio to Op. Exp. 1930
Char. & West. Carol .....	\$203,688	\$90,797	3.1	27.3
Bessemer & Lake Erie.....	635,212	65,212	9.3	6.9
Clev. Cin. Chi. & St. Louis..	5,510,204	1,246,500	18.5	...
Denver & Salt Lake.....	349,901	51,159	12.7	17.7
Duluth, Miss. & North.....	1,739,073	341,506	16.5	15.0
Duluth, S. Shore & Atlantic..	570,995	42,091	6.9	...
Duluth, Winn. & Pacific....	365,124	+213,054	+140.0	21.2
Lehigh & Hudson River.....	103,666	3,113	2.9	9.7
Louisiana & Arkansas .....	775,824	135,920	15.0	16.5
Michigan Central .....	5,287,871	199,818	3.6	...
Midland Valley .....	142,227	98,551	39.4	7.9
Monongahela .....	341,983	32,387	8.6	9.4
Montour .....	152,922	+8,771	+6.1	9.1
New York Central.....	27,332,550	2,980,870	5.0	7.5
New York, Ont. & Western..	1,072,966	100,272	8.5	12.7
Norfolk & Western.....	7,415,207	250,648	3.4	12.2
St. Jo. & Grand Island.....	318,447	69,957	18.0	13.6
San Diego & Arizona .....	137,527	+12,617	10.2	...
Texas & Pacific .....	4,504,881	1,586,348	26.1	17.0
Wabash .....	4,626,741	+255,557	+5.8	9.8

cent of annual operating expenses to 39.2 per cent, with the Delaware, Lackawanna & Western, Chesapeake & Ohio, Chicago Great Western, Monon, Chicago & Alton and Erie leading the list of roads having a thousand miles, or more, of line, with balances at the close of 1930 representing 4.7, 4.9, 5.7, 5.7, 5.8 and 6.1 per cent of operating expenses, respectively. Out of 118 roads for which figures have been computed, there were 32 roads whose ratios were below the ratios of 1929, while 40 had ratios for 1930 less than 10 per cent. Among the roads with ratios under 10 per cent, besides those already mentioned, are the Bessemer & Lake Erie, with a ratio of 6.9 per cent; Southern, 6.8; New York Central, 7.3; Pennsylvania, 7.7; Central of New Jersey, 7.5; Wheeling & Lake Erie, 7.8; Seaboard Air Line, 8.1; Central of Georgia, 8.3; Boston & Albany, 8.0; Lehigh Valley, 8.5; C. M., St. P. & P., 8.9.

### Turnover Slower

The divisions of the total balance and a determination of a turnover figure have again been made this year in recognition of the fact that stocks of fuel, rail and ties profoundly affect the total book balance of supplies and are not necessarily regulated under the same policies or handled in their entirety by the department responsible for the common materials. A study of stocks on a turn-

over basis, while not free from misleading possibilities, is much in demand. The days' or months' supply was determined by assuming that the supplies reported on hand at the close of the year represent the average monthly supply balance and that one-twelfth of the value of the material reported used represents an average month's consumption. This index is particularly subject to error in connection with ties and rail, which are likely to be in process of accumulation at the close of the year and are not subject to uniform consumption.

### Fuel, Rails and Ties

The table developed on this basis shows that stocks of fuel reported on hand at the close of the year 1930 ranged from a few days' supply to over 100 days' supply (the latter representing particularly the conditions on roads using oil), and the average was 40 days, as compared with 34 days' supply at the close of 1929. Tie stocks, which must be accumulated well in advance of their use for seasoning and treatment, ranged from less than a month's supply on roads not using treated ties or maintaining their own stocks, to a two years' supply, and the average was 10.9 months' supply. Rail stocks ranged from a one month's supply to 47 months' supply, the average being 4.9 months' supply compared to an average of 3.6 months at the close of 1929.

Reports from 57 roads showing \$2,768,444 of commissary supplies on hand and \$22,299,412 commissary supplies used, show a range from 6 to 159 days' supply and an average of 45 days' supply, while 90 roads, reporting an aggregate inventory of \$1,939,791 of stationery supplies and a consumption of \$18,505,358 of stationery, show a range from 6 days' to 182 days' supply. Stocks of other material (for the most part, excluding scrap as well as stationery and commissary), reported by 98 roads, range from a one month's supply to 11.8 months', depending somewhat on whether or not railroads charged material out of stock when issued or when applied, and the average was 3.8 months' supply.

### Storehouse Stocks

The table shows that the stores departments of large number of roads are operating on a two months' supply, or less, according to their reports of miscellaneous materials on hand and used. Among these roads are the Chicago & Alton, with a 1.6 months' supply; Delaware, Lackawanna & Western, 2.2; Chesapeake & Ohio, 2.3; Erie, 2.1; International-Great Northern, 2.4; New York, Chicago & St. Louis, 2.1; Pennsylvania, 2.5; Pere Marquette, 2.4; and Wheeling & Lake Erie, 2.5.

### Scrap Iron Accumulates

The turnover reported for total materials are computed on the basis of the total material, less scrap, reported by the railroads in their special reports to the *Railway Age* and not on the basis of the total inventory shown in the table, which comprises the official report of inventory to the Interstate Commerce Commission, and, may be larger in some cases than the report of material on hand, less scrap. A total of 82 roads, which made separate reports of scrap had \$7,581,509 of this material on hand at the close of 1930, and on 59 roads for which statistics of sales, as well as scrap on hand, are available, the book value of scrap represented a 57 days' supply, the turnover of individual roads ranging from less than a week's supply to 155 days' in the case of one road which reported over \$1,000,000 in its scrap account. The figures on the value of scrap on hand and sold during 1930 are omitted from this review for lack of space.

# Safety Performance in 1930

## Record for C. & N. W.

Education of employees  
in safe methods lowers  
deaths to 0.14 and  
injuries to 2.55 per  
million man-hours

Redlight Above  
Headlight Serves to  
Flag Approaching  
Trains in Emer-  
gencies



**T**HE Chicago & North Western Railway set up a new accident prevention record for that railway during 1930 by reducing the deaths of employees to 0.14 per million man-hours and the injuries to employees to 2.55 per million man-hours. Because of the low casualty rate of 2.69, it was declared the winner of the bronze plaque for Group A (all roads reporting 100 million man hours yearly) in the annual steam railroad accident prevention contest conducted by the National Safety Council. The trophy will be presented at a dinner in Chicago on May 19. This improvement represents a marked decrease as compared with 1929 when the death rate was 0.29 and the injury rate was 9.30. During 1930 only 14 employees were killed and 259 injured, as compared with 34 killed and 1,085 injured in 1929, while the man-hours exposure totaled 101,096,493 in 1930 and 116,694,548 in 1929. In addition, the total of all classes of fatalities was reduced 22 per cent or from 185 in 1929 to 143 in 1930, and of all classes of injuries 58 per cent or from 1,563 in 1929 to 654 in 1930. There were no passengers killed during 1930 and the injuries to passengers decreased 25 per cent, or from 194 in 1929 to 145 in 1930. At the same time, highway crossing accidents decreased 26 per cent, or from 256 in 1929 to 190 in 1930.

This new record for the North Western follows a continuous reduction in accidents over a period of years and is the result of close supervision, proper instructions, the establishment of rules to safeguard employees, the educating of employees and officers in safety and the adoption of devices to prevent accidents. To bring about this remarkable reduction, all officers and employees were impressed with the necessity of employing common sense in the day's work, while at the same time they were inspired with the desire to

reduce accidents. The spirit which is largely responsible for the good showing is indicated in the North Western slogan "it is better to cause a delay than to cause an accident."

### Accident Prevention Began in 1910

The record of 1930 has for its background a continuing effort to reduce accidents, which started on August 3, 1910, when the North Western perfected a safety first and accident prevention organization, the first for any railroad or industry, and began a campaign for the prevention of accidents to employees. The late Ralph C. Richards, then general claim agent, who created the slogan "Safety First," and who initiated the movement, was made chairman of the Central Safety committee, the membership of which consisted of the heads of all departments. This organized move to reduce deaths and injuries was precipitated by an increase in the number of employees killed and injured each year, beginning with 1900 and continuing to June 30, 1910, when the records of the fiscal year showed 97 employees killed and 8,404 injured.

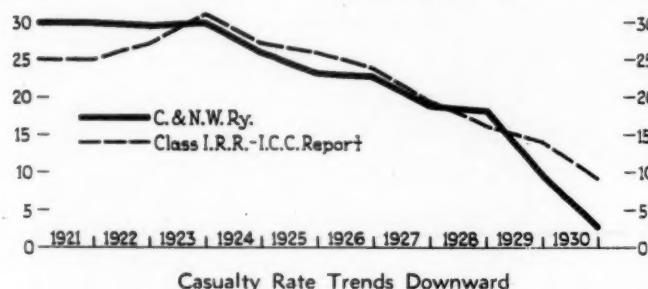
Within 30 days after the formation of the central committee, employees' committees were formed on each operating division and at the end of the first 10 months, there were 54 fewer deaths and 1,559 fewer injuries than during the same period in the previous year. On April 20, 1911, a safety-first banner, the first of its kind, was presented to the Sioux City division for leading other divisions in the reduction of accidents.

During the first 10 years, the safety-first movement resulted in a total reduction of 372 employee deaths or 36.5 per cent, and 21,072 employee injuries or 25 per cent; a decrease of 8 passengers killed or 7.8 per cent and of 1,844 passengers injured or 20.8 per cent;



while all others killed decreased 513 or 22.8 per cent, and those injured 315 or 5.4 per cent. On June 1, 1924, Mr. Richards retired and Frank Wenter, Jr., was appointed general claim agent. Under the latter's supervision, the work was continued and through intensive effort on the part of the officers, supervisors and employees, there was a gradual reduction of casualties per million man-hours to employees as well as a gradual reduction in accidents of all kinds.

On July 1, 1929, the Safety and Accident Prevention department was placed under the direction of G. B. Vilas, general manager, H. A. Parish, assistant to the general manager, C. H. Longman, supervisor of safety,



and S. M. Galaty, secretary. At the same time, supervisors and foremen in all departments were told that they would be held accountable for all accidents to themselves or to employees under their jurisdiction. A change in the methods of employing men was effected and supervisors and foremen were instructed to hire only persons whose mental and physical qualifications would enable them to become safe and efficient workers. Supervisors and foremen were also held accountable for failing to observe and correct unsafe conditions relative to the property, tools or equipment with which men were required to work and for failing to correct any employee engaging in an unsafe practice or violating a rule. A new system of reports and records was devised and an intensive campaign was begun to determine the cause of all accidents.

#### Riding Leading Footboards Prohibited

The reduction of accidents in 1930 has been brought about by many factors, among which were changes in certain operating rules. Rule 714 was amended to prohibit men from standing upon the footboards of locomotives in motion while coupling. Going between cars or between car and locomotive while in motion is also prohibited. Standing upon a footboard between the locomotive and cars is prohibited. Walking directly in front of a moving car or locomotive for any purpose is prohibited. Standing between the rails and getting on an approaching car or locomotive is prohibited. Pushing over drawbars of moving cars or locomotives for any purpose is prohibited. If, for any reason, a drawbar, knuckle, knuckle-pin or locking block must be adjusted prior to making a coupling, or when the coupling does not "make," the locomotive or cars must be separated by not less than 20 ft. before an employee may go between them to make the adjustment.

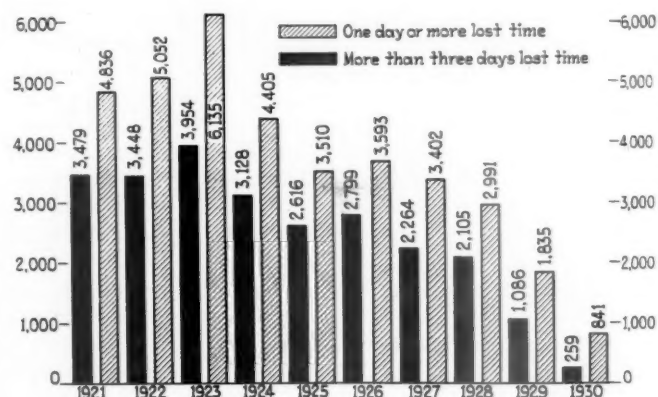
Riding the deadwoods or drawbars of locomotives or cars, or the tender beams of locomotives in the direction of movement, is prohibited. Riding the footboard of a locomotive in the direction of movement is likewise prohibited. As a result of these latter provisions, the number of employees injured from these causes has been greatly reduced. Prior to the revision of these rules, 6 employees were killed and 81 were seriously injured during the period from 1926 to 1929, while during

1930 not one employee was killed or injured, although 412 persons were killed on the railroads of the United States while getting on and off the footboards and steps of locomotives during the same year.

#### High-Powered Red Light on Locomotives

As a means of eliminating accidents caused when a train fouls the opposite main track, the class H mountain type locomotives assigned to passenger and freight service between Chicago and Omaha, Neb., have been equipped with an emergency high-powered red light located just above the regular headlight and connected with a headlight switch in the cab of the locomotive, so that the engineman, when the train is brought to an unexpected stop or something unusual happens may, by throwing one switch, turn off the white headlight and turn on the red light and thus warn an approaching train. With this red light, trains approaching on the opposite track are flagged. This light is used during the day as well as at night in cases of emergency. It can be seen at as great a distance as the white headlight, and when it appears, an engineman on an approaching train must immediately bring his train to a stop and proceed only after finding the track clear. This rule is applicable at all times and the high power red light cannot be used for any other purpose. Before this red light was adopted in October, 1929, accidents occurred when a car of a freight train was derailed and fouled the opposite main track, but since that time no approaching trains have struck derailed cars.

In order to guard against track motor-car accidents, several rules have been added or changed. One limits the speed of gasoline-driven motor cars to 20 miles an hour, which insures the car being under control at all times. Another prohibits the running of a gasoline motorcar parallel to a moving train. When a train in



Lost Time Because of Injuries Shows Remarkable Decline

either direction is about to pass a motor car, the operator must stop the motor car and wait until the train has passed before proceeding. This has brought about a marked decrease in motor-car accidents.

A device which has been very effective in the prevention of toe injuries is a shoe with a reinforced toe which is furnished employees. At present North Western employees have 4,500 pairs in use, and, as a result, the number of toe injuries has been reduced from 250 in 1929 to 24 in 1930.

Among the 22 divisions, shop and terminal classifications, 14 went through 1930 without an employee being killed, as compared with 10 divisions in 1929. Of these, eight had the same record in both years. The Northern Iowa division had the lowest casualty rate, it being 0.66. During the year, there were no employees



killed and only two injured on this division, although the man-hours worked totaled 3,023,696.

#### Departments Well Organized

Among the six departments on the North Western, the motive power department operated for two years with 14,816,263 man-hours in 1930 and 16,877,450 in 1929, without an employee being killed. The car department completed 1930 with a casualty rate (killed and injured) of 1.20 and the track department with a casualty rate of 1.35, the man-hours being 10,833,436 and 23,634,269 respectively.

In the car department, which employs 5,000 men, two employees were killed in 1930 and three in 1929, while the number injured decreased from 36 in 1929 to 11 in 1930. The man-hours worked totaled 10,833,436 in 1930 and 12,594,288 in 1929. To obtain these results, the department held 500 meetings of supervisors and men during the year. The intense supervision and the educational methods used by supervisors, foremen and district master car builders also aided, while care in the selection of employees proved of marked benefit.

The motive power department worked an average of 6,000 men per month, and a total of 14,816,263 man-hours during 1930. There were no fatal accidents in the department, but 24 men were injured and the casualty rate per million man-hours was 1.62.

In the track department, which includes regular section and extra-gang men, there were 4 employees killed and 28 injured in 1930, as compared with 9 killed and 231 injured in 1929. The man-hours worked in 1930 totaled 23,634,269 and in 1929 they totaled 27,293,953. In 1930 the number of employees killed was 0.17 per million man-hours and the number injured 1.18, as compared with 0.33 killed and 8.46 injured in 1929.

The decrease in accidents in the track department was brought about by intensified work on the part of the safety department and by the track department checking over all of the gangs, thoroughly examining the new men who are employed in the gangs, and culling out all but the best material. Supervisors were on the alert and the supervision was close and intense. Daily meetings of 15 minutes duration were held by all section foremen and their men. Extra gangs were given daily instruction by the extra-gang foremen and the roadmasters.

#### Transportation Employees Improve

In the transportation department, which includes trainmen, switchmen, yard clerks, switch tenders, train attendants, crossing flagmen, gate tenders and stationmen, 6 employees were killed and 139 injured in 1930, in contrast to 14 killed and 567 injured in 1929. During the year 1930, the man-hours worked in the transportation department totaled 33,956,189 as against 38,680,300 for 1929. The casualty rate per million man-hours in 1930 was 0.17 killed and 4.09 injured, and in 1929 it was 0.36 killed and 14.66 injured. This decrease in deaths and injuries in 1930 over 1929 was brought about by more intensified supervision and the enforcement of safety and operating rules. A total of 290 meetings was held during the year.

In the freight house operation at Proviso, the largest freight transfer station in the world, where more than 2,500 tons of less-than-carload freight are handled daily, and where a total of 1,824,943 man-hours were worked, there were but seven reportable accidents. There were 114,587 tons of freight handled to each accident, while the casualty rate was 3.83 per million man-hours. At the Milwaukee, freight house, where 843,078 man-hours were worked, and where 288,957

tons of freight were handled, there was only one reportable accident, the casualty rate being 1.20. At the Grand Avenue freight house in Chicago, where all of the "down-town" freight is handled and loaded into cars, involving double handling, a total of 313,976 tons were handled, and a total of 651,462 man-hours were worked. The reportable accidents totaled 3 and the casualty rate per million man-hours was 3.27. The

C. & N. W.—Employees Killed and Injured, by Departments

Department	Year	Killed	Injured	Man-Hours	Killed Per M.-H.	Injured Per M.-H.
Motive Power	1930	0	24	14,816,263	...	1.61
	1929	0	108	16,877,450	...	6.39
Car	1930	2	11	10,833,436	0.18	1.01
	1929	3	36	12,594,288	0.24	2.86
Track	1930	4	28	23,634,269	0.17	1.18
	1929	9	231	27,293,953	0.32	8.46
B. & B. & Signal	1930	1	37	5,166,221	0.19	7.16
	1929	5	66	5,884,197	0.85	11.21
Transportation	1930	6	139	33,956,189	0.18	4.09
	1929	14	567	38,680,300	0.36	14.65
Store, Construction, Tie Plants and Misc.	1930	1	20	12,190,115	0.08	1.64
	1929	3	77	15,364,360	0.19	5.01
Total	1930	14	259	101,096,493	0.14	2.55
	1929	34	1,085	116,694,548	0.29	9.30

remarkable decrease in the casualty rate in the important freight houses was a large factor in bringing down the casualty rate per million man-hours on the railroad as a whole.

#### Crossing Accidents

During 1930 there were 190 reportable accidents at highway grade-crossings, which resulted in 60 fatalities and 130 injuries, a reduction of 26 per cent as compared with the previous year. In 1930 the North Western operated a total of 15,397,430 freight-train miles and moved 23,704,697,000 gross ton-miles in nine states. It also operated 17,487,052 passenger train miles and carried 26,259,520 passengers without one being killed in a train accident.

The constant checking on the proper whistling for crossings, on the strict observance of all rules pertaining to the operation and handling of trains over crossings and on the condition of gates and mechanical appliances at crossings are credited with the general reduction in crossings accidents. There was a general decrease in accidents occurring at crossings, and at stations where switching was performed, all members of train crews and all other employees taking care to guard crossings whenever there were movements of trains over crossings that were not otherwise protected. In addition, the grades were separated at 21 crossings during 1930, and 128 additional crossings were afforded mechanical and manual protection.

## B. & M.-New Haven

### Merger Recommended

(Continued from page 974)

should be determined concurrently with the working out of the plan for the rest of the railroads in the Eastern district.

2. In order that the Boston & Maine and New Haven may be freed from the present excess ownership of their stocks by the Pennsylvania, we recommend as the first step that the Governors ask the managements of the Pennsylvania and of the Boston & Maine and New Haven to co-operate in working out an arrangement which will remedy the present situation and make it possible for the Boston & Maine and New Haven to proceed immediately to formulate a plan for consolidation which can be submitted to the Interstate Commerce Commission while the Four-Party plan is before it for approval. Such action would place a definite proposal from the managements of the New England railroads before the Commission and thereby make certain

that the future allocation of the New England roads would be considered in connection with the Commission's consideration of the Four-Party plan. We wish to make it clear, however, that until the Pennsylvania's present ownership has been substantially reduced to the satisfaction of the Governors, New England should oppose any proposal for consolidation of the Boston & Maine and New Haven. The institution of legal proceedings against the Pennsylvania should be avoided if possible. Such a contest would be disadvantageous to the New England roads, injurious to the interests of the public they serve, and a disturbing influence to the general railroad situation.

We suggest the following method for reducing the present excess ownership of the Pennsylvania Railroad and Pennroad Corporation in the Boston & Maine and New Haven to an amount which will protect these roads as individual roads or as a consolidated system from danger of undue influence from the Pennsylvania or any other trunk line. We submit the plan in its general outline. We have not attempted to work it out in all its details, for they must necessarily be subject to final determination by negotiation. We believe it to be practicable and worthy of serious consideration.

We suggest:

(1) That the Pennsylvania and Pennroad Corporation should not retain a combined ownership in excess of 10 per cent of the total voting stock in either the Boston & Maine or New Haven.

(2) That their holdings of stock in excess of the above amounts should be placed in the hands of trustees to be liquidated under the following conditions:

a. Time, terms and conditions of sale to be approved by the Pennsylvania and Pennroad.

b. No stock to be sold to another railroad except with the approval of the Interstate Commerce Commission.

c. Voting power of the stock placed in trust to be voted by the trustees pending its sale.

We have suggested 10 per cent as the limitation of Pennsylvania ownership because this amount appears to be generally recognized in the laws passed by various states to protect public service and other corporations from outside control as the limit which should not be exceeded. We believe the Pennsylvania's ownership should not be permitted to go beyond this maximum. If it is not exceeded the danger of control will be much lessened. The plan suggested, in our opinion, is fair to the Pennsylvania and we believe it would be to its advantage to accept such a proposal. With the return of more normal markets for railroad securities, it is to be expected that the stocks of the Boston & Maine and New Haven would be purchased by a syndicate and distributed to private investors. This should result in a considerable increase in New England ownership. We suggest that the directors of the Boston & Maine and New Haven be requested by the Governors to cooperate with them in working out this plan with the Pennsylvania.

3. In the event that it is found impossible to obtain reduction in the Pennsylvania's holdings by means of negotiation as suggested above, we recommend that the Governors institute appropriate proceedings as suggested by our counsel to seek a termination of such holdings.

4. We further recommend in the event of failure to effect a solution of the problem by negotiation with the Pennsylvania that the Governors request the Interstate Commerce Commission, should the Four-Party plan be approved, to stipulate as a condition of its approval that the Pennsylvania should divest itself of its excess ownership in the Boston & Maine and New Haven. The basis for such a stipulation would be that otherwise the Pennsylvania, already the largest and most powerful trunk line, would be much further enhanced in size and strength by its virtual control of the two largest railroads in New England. This would throw seriously out of balance the parity of competitive opportunity contemplated by the Four-Party plan.

5. We further recommend that in the event of the Interstate Commerce Commission's approval of the Four-Party plan or of a consolidation of the Boston & Maine and New Haven the Commission be requested to impose in its order of approval a condition that no railroad, directly or indirectly, should acquire stock in the New England roads without the approval of the Commission.

6. We recommend that the Governors urge upon the New England members of Congress at the next session that they support legislation providing for regulation by the Interstate Commerce Commission of the activities of holding companies in acquiring stocks of railroads.

## Transport Secretary Advocated by Ripley

PROFESSOR William Z. Ripley of Harvard, in a recent reference to the F. J. Lisman plan for a railroad "umpire," suggested that the plan be modified so that instead of being a part of the railway industry the "umpire" would be a new member of the President's cabinet—a Secretary of Transportation. The foregoing suggestion was made in an address delivered at Columbia University, New York City, on April 20, as one of a series of discussions on "The Major Engineering—Economic Problems of the Day" conducted under the joint auspices of the Columbia University Department of Civil Engineering, the Institute of Arts and Sciences and the New York Section, American Society of Civil Engineers.

The new cabinet officer, according to Professor Ripley's plan, would assume the administrative functions of the Interstate Commerce Commission, leaving the judicial function with the present body. The address in general was a survey of major problems confronting railways at present. It was in closing that Prof. Ripley suggested the Secretary of Transportation after his finding that the railroads "must discipline their own membership and create a solidarity of opinion among themselves."

The address follows in part:

The American public by this time is well aware of what the causes of the trouble of the railroads are, other than the general business depression. First, of course, is the highway situation. That is by way of remedying itself in some parts of the country although conditions are most uneven. Legislatures are being importuned to act. A higher type of educational campaign is being launched to persuade them to regulate this highway situation—to regulate the length and width of trucks, and buses; to limit their speed; to make them file rates, and even regulate the hours of service of their employees. In a number of the western states legislation of this kind will take place this winter. In the south something of the same thing will happen. It is less certain here in the east and particularly in New England. Naturally, there are forces working against such legislation. The automotive industries are doing effective work to prevent such action everywhere.

As for the waterways, you have heard from General Ashburn probably a defense of what is being done by the United States Government. I regret very much inability to share his viewpoint in this matter. I am thoroughly convinced that it should not be the function of the government to take away the life of the railroads; and especially those which operate in a territory like that of the Mississippi Valley, by operating lines on the river. General Ashburn would tell you that they keep accurate account of the operating costs. But it is utterly impossible to allocate those expenses so far as the right-of-way is concerned. The government engaging in activity of this kind differs entirely from similar action in the field of public utilities. A certain number of municipal plants give desirable means of comparison with privately operated companies; but in a venture like that on the Mississippi where all you do is to keep account of movement expenses, results are of slight value. And insofar as you have broken down your rail system, harm results to the community. It is to be hoped that there will be a clear subdivision as to Federal policy between those waterways which are susceptible of development to give a service that the railroads cannot give, and that the public may be educated to refuse to spend money to develop minor waterways which cannot possibly compete with railroads.

What about pipe lines? Pipe lines are bound to come of course. But there again it would seem that the way to handle it would be to put these common carriers under the same regulation as the railroads already are. There have been securities issued against pipe lines vastly in excess of the cost of the property. There is a good deal of high finance going on in the south and southwest in placing securities

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# Tie Production Greatly Curtailed

Lack of demand and reduced prices discourage output—  
Stocks subnormal

**T**HE present plight of those industries that look to the railways as almost the sole market for their production was evidenced strikingly in reports presented at the 13th annual convention of the National Association of Railroad Tie Producers at West Baden, Ind., on May 5-7. This convention, which was attended by more than 75 tie-producers and railway officers interested in the inspection and use of ties, was presided over by E. E. Pershall (president, T. J. Moss Tie Company, St. Louis, Mo.) vice-president of the association, in the absence of R. C. Hobbs (president, Hobbs-Western Company, St. Louis, Mo.) president, who was unable to attend because of a recent accident.

Shortly after the convention was called to order, a report of the year's activities, prepared by Mr. Hobbs, was read in which he related the extent to which the members of the organization had responded to the appeal of the Drought Relief Commission to purchase ties far in excess of orders in hand from the railroads, as a means of providing work for farmers in the stricken agricultural areas. He also reported the action taken by the association in response to a request from J. M. Kurn, president of the St. Louis-San Francisco, that a committee from the association visit the scene of a passenger train derailment on that railway near St. Louis in order to pass on the accuracy of newspaper reports to the effect that bad ties had contributed to this accident. Such a committee was appointed which, after examining in detail the ties in the track at the point of the derailment, reported that the criticism was without foundation. A copy of this report was transmitted to the Interstate Commerce Commission which body stated later in its report on this accident that "the wreck was not due to bad ties."

Mr. Hobbs also reported at some length on the organization in St. Louis, Mo., late in 1930, of the Shippers and Manufacturers Transportation Association for the purpose of making surveys of various modes of transportation, with special reference to the competition of buses and trucks on the highways. In a later report, E. E. Pershall described in detail the work of this new organization in opposing bus and truck activities and in promoting legislation to curb them. He stated that bills had already been introduced in 15 central western and southern states to this end. Members of the Tie Producers Association have contributed \$6,250 to the work of the new organization to date. This subject also was discussed by E. T. Miller, vice-president and general solicitor of the St. Louis-San Francisco, at the annual dinner on Wednesday evening, at which time Mr. Miller traced the growth of agitation against the buses and trucks on the part of the highway-using public and the almost spontaneous wave of legislation that is now sweeping through the central and southern states. He described the progress of legislation to curb the special privileges now being enjoyed by these carriers on the highways, citing several bills that have been enacted into law in recent weeks and referring to the still larger number that are now before various legislatures.

At the concluding session of the convention the following officers were elected for the ensuing year:

President, E. E. Pershall, president, T. J. Moss Tie Company, St. Louis, Mo.; first vice-president, S. S. Watkins, vice-president, Joyce-Watkins Company, Chicago; second vice-president, B. N. Johnson, B. Johnson & Sons, Richmond, Ind. Roy M. Edmonds, St. Louis, Mo., was re-elected secretary and treasurer. The district directors selected are as follows: Pacific coast district—E. R. Wade, Charles R. McCormick Lumber Company, Portland, Ore.; North Central district—B. A. Scott, president, Scott Tie Company, Detroit, Mich.; North Eastern district—F. W. Cherrington, Jennison-Wright Company, Toledo, Ohio; South Eastern district—F. P. Dabolt, president, Tennessee Tie Company, Nashville, Tenn.; and South Central district—J. A. Tiller, J. A. Tiller & Son, Little Rock, Ark.

## Reports from Producing Areas

A feature of the conventions of this organization is the presentation of reports of conditions in the various major tie-producing areas. These reports indicate the drastic changes that have taken place during the last year not only in the reduction in demand for ties but in the increase in right-of-way production.

A. B. Lacy (vice-president, M. T. Blassingham & Co., Inc., Norfolk, Va.) reported that in the area east of Indiana and north of North Carolina production began to exceed demand as early as July, 1930, output being stimulated by the drought in agricultural areas and by decreased demands for lumber from the small mills. Line production increased in many areas to an extent that not only caused the roads to curtail or eliminate off-line contracts, but also embarrassed them in accepting line production. Reduced prices failing to slacken output, monthly allotments have been adopted by numerous roads in this area to still further discourage tie manufacture.

F. P. Dabolt (president, Tennessee Tie Company, Nashville, Tenn.) reported that in the southeastern district sales have averaged 25 per cent less than in the previous year. Railroads purchasing right-of-way ties are accepting them in limited quantities. Northern roads that ordinarily purchase large quantities of ties in this territory are supplying largely increased percentages of their requirements from their own rights of way. Stocks in the southern part of the district are very small and over the balance of the territory are about 75 per cent of normal, with present production about 50 per cent of that of the previous year. The cost of producing ties today in this area is about 25 per cent below that of a year ago, due to cheaper labor.

W. J. Foye (Foye Lumber & Tie Co., Omaha, Neb.) reported that the demand for crossties from the North Central states during the last year has been about 60 per cent of that for the preceding year, and the production correspondingly reduced, with the result that the stocks on hand now are somewhat less than a year ago. There is no serious surplus and there are no distress stocks in this area.

J. A. Tiller (J. A. Tiller & Son, Little Rock, Ark.)



reported that in the South Central district, conditions were fairly normal in the first quarter of last year but that as the season advanced and the drought became more pronounced, much labor turned from agriculture to tie production. With greatly reduced demand from the railways, this resulted in reduced prices. By the end of the year there was an almost complete shut-down in both production and purchase.

Conditions on the Pacific Coast were outlined by E. R. Wade (Charles R. McCormick Lumber Company, Portland, Ore.). During 1930 the demand for ties was at an extremely low ebb. Most of the western railroads placed fewer orders than they had during any similar period since the war, and the anxiety to get the small

amount of business offered resulted in a continual slashing of prices. The inability to secure tie orders in normal volume was such a serious blow to the small and medium-sized mills that the latter half of 1930 saw only from 35 per cent to 40 per cent of such concerns operating. Tie prices have declined steadily and have for some time been down to a pre-war level. During the last few months the basis on which sales have been made has had no relation to the cost of production for the majority of plants. Such a limited volume of orders has been offered that the small concerns that maintain no accurate records of production costs have had an output sufficient to supply the demand, with the usual disastrous results.

## The Convention Program

The program for the convention consisted in the main of papers by railway men on the care and use of crossties, supplemented by two papers by representatives of the Forest Products Laboratory on more technical phases of the problem.

In a paper on Tie Futures and Forestry, R. D. Garver, senior engineer, Forest Products Laboratory, Madison, Wis., offered a forecast of the crosstie requirements of railways of the United States in future years. Based on the annual tie requirements of 27 railroads for the past 20 years, as compiled by the American Wood-Preservers' Association, which averaged 181 ties per mile in 1928, he assumed a straight line reduction in demand to 104 ties for these roads by 1948. The average requirements of all of the roads at that time is assumed to be 39 ties per mile more, namely the amount by which the average requirements per mile of all the railways exceeded those of the 27 roads in 1928. Therefore, assuming a demand of 143 ties per mile for renewals, and an average increase per year in the mileage of all tracks of 3,000 miles, he concluded that the demand for crossties for both renewals and new tracks in 1948, would be 79,000,000.

### Fungus Defects in Crossties

In an unusually comprehensive and thorough paper on the Identification of the Fungi and Stains Which are Permissible Under the Standard Specifications for Crossties, C. Audrey Richards, pathologist, Forest Products Laboratory, Madison, Wis., described the various types of fungi that attack wood, the conditions under which they are propagated, the results which they produce and the indications which enable them to be detected in their incipient stages. After defining decay as the result of the growth of wood-destroying fungi through the wood, Miss Richards described the more common forms of fungi and classified them as to their structure and appearance. She then showed how fungi enter wood through wounds in the timber, and after classifying the various kinds of rots produced by these fungi, she described in detail the various rots commonly affecting tie timbers.

### Gum Ties on the Frisco

By Linn L. White<sup>1</sup>

After considerable deliberation, we decided about five years ago to buy gum ties and as we have become

<sup>1</sup> Chief Clerk, Tie and Timber Department, St. Louis San Francisco.

more familiar with the wood's peculiarities, we have lost our fear of it, and it now forms one of our most important tie timbers.

### Handling of Gum Ties

We have all heard that gum should be cut in the winter months—that it was dangerous to attempt to handle it during warm weather. Our experience is that gum can be handled successfully throughout the year. The important thing is to get the ties to the treating plant as soon as possible after the tree is cut down. They should not be allowed to lie in the woods, but should be hauled to the loading point as soon as made.

They should then be inspected as soon as possible and shipped at once to the treating plant. We do not allow gum ties to be loaded in closed cars but use coal or stock cars. After reaching the plant, they are yarded in the customary treating plant style, the same as our other ties. If handled in this way, there is no reason why they cannot be seasoned properly without danger of decay.

It is possible to hold oak, and to a less extent, pine trees on the yard for some time after they are dry enough to treat, but gum ties should be treated when ready, as there is considerably more danger of losing them than either of the other woods. The inspector at the plant must be an experienced man for it is more difficult to detect incipient decay in gum than in either oak or pine. We have had practically no trouble with our gum ties; in fact, we have not lost or degraded 0.5 per cent of the ties received at the plants.

When we started furnishing treated gum ties, there seemed to be a general impression among our maintenance forces that they were decidedly inferior to oak or about on a par with pine. A recent canvass of our division engineers shows a decided change of opinion. Without exception they are all satisfied with the ability of the gum to hold the gage and resist rail cutting. All preferred gum to pine, three preferred red oak as the best all-around tie, two preferred gum, and the other three stated that gum was as good as oak except on sharp curves. The most favorable reports were received from the southern parts of our line where gum showed up better than oak in checking and splitting. Furthermore, there seems to be a growing feeling that gum ties will stand up better than any other ties we have, in case of derailment, for pine ties cut badly and oak ties splinter. It should be understood that the oak ties referred to are not the so-called "southern

oak," but are cut mostly from hill timber in the Ozark region.

The first cost of gum ties is somewhat less than oak; there is also a substantial saving in the interest charge for carrying the ties during the seasoning period, as gum is ready for treatment in one-third to one-half the time required for oak. Theoretically, this would permit us to handle two or three times as many gum as oak ties in the same amount of space on the treating plant yard, although we do not obtain that efficiency in actual practice.

## The Monon's Experience

By A. Anderson<sup>2</sup>

As a result of close inspection and the practice of giving all ties preservative treatment, the annual tie renewals per mile of track on the Monon have been reduced from a maximum of 476 and a 5-yr. average of 430 to a 5-yr. average of 123 per mile of all tracks. Prior to 1908, all ties were used without treatment and almost any kind of a tie was accepted. Beginning with that year, purchases were limited to certain woods, inspection was improved and all woods except white oak were creosoted. Within five years the annual renewals began to decrease, the 5-yr. averages from 1900 being: 1900-1904, 293; 1905-1909, 420; 1910-1914, 430; 1915-1919, 194; 1920-1924, 151; 1924-1929, 123.

All ties are obtained along the line. They are purchased under C. I. & L. specifications, which are practically the same as those of the United States Railroad Administration, and include white oak, black locust, black walnut, red oak, honey locust, hickory, ash, beech, cherry and hard maple. About 25 per cent are white oak, about 65 per cent are red oak and the remainder are divided among the other woods.

Beech and hard maple ties must be made from trees that have been felled between October and February and within one month after the trees are cut. Practically all ties accepted are Size 3 or 4, although 5 per cent of Size 2 ties are taken. They are sent immediately to the storage yard for seasoning under sanitary conditions. Only about 500 ties have been lost through decay before treatment during the last 16 years.

In the beginning, we favored hewed ties, but lately we prefer sawed ties, about 65 per cent of our purchases now being the latter. We apply S-iron to all ties that show indications of splitting during the seasoning period, and are using anti-splitting devices on about 85 per cent of our ties. In addition, section foremen are provided with S-irons and are instructed to apply them at any time that there is a tendency to split after the ties are in the track.

After the proper seasoning, all ties, now including white oak, are given a 6-lb. treatment by the Lowry process, of a 60-40 creosote-coal tar mixture. Immediately after treatment they are shipped to the point of use and allowed to season from four months to a year before application.

A total of 2,750,000 ties are in service on the Monon, 98½ per cent of which are creosoted. Based on average annual renewals of 118,788 ties for the last five years, the average life of our ties is 23 years. We still have large numbers of ties in service bearing dating nails for 1908, 1909 and 1910. Many of the removals are due to rail cutting and spike cutting and not to decay, but with the more extended use of tie plates we are decreasing the number of failures from these causes.

<sup>2</sup> Engineer Maintenance of Way, Chicago, Indianapolis & Louisville, Lafayette, Ind.

## Care in Handling Ties

By Horace Paul<sup>3</sup>

The seasoning period prior to treatment is the critical period in the life of a tie. A sound tie safely seasoned is well on the road to service under rails.

Checking and decay are the two great menaces to a seasoning tie. If ties are piled close together, checking will be retarded but so will seasoning and one will probably have stack burn and serious decay. Hill timber and the judicious use of S-irons or some similar anti-checking device are the best safeguards against excessive splitting and checking. It does not take many split ties to pay for a lot of S-irons.

Particular care should be exercised in the selection of yards where the ties are to be stacked. The drainage, the weed growth and the nature of the soil should all be considered. A yard should preferably be selected with a natural slope, allowing water to drain away readily. All weeds and growth should be kept down. A yard surfaced with gravel or, better yet, cinders is to be desired. Rotten wood and other debris should be removed or collected and burned. The requirements as to stacking, with the ties well spaced, bottom ties at least six inches off the ground, outside ties in each layer edged, should be rigidly enforced as this admits of good air circulation and good drainage.

If these precautions to control moisture and decay are observed and if the ties were originally sound, they should still be sound when seasoned.

## Anti-Splitting Devices

By S. E. Shoup<sup>4</sup>

Many shapes of anti-splitting irons have been devised, but the number recommended by the Tie committee of the A.R.E.A has been reduced to three shapes, namely the S, the C, and the Saf-Tie, perhaps better known as the Beegle iron. The Tie committee recommends two sizes of each iron, the small size, about 5 in. over all, for size 3-A and smaller ties, and the large size, about 6 in. over all, for sizes 4 and 5 ties. A width of ¾ in. and a 13-gage thickness with a double-bevelled edge are common to both sizes. In the opinion of the committee, 13-gage metal is the lightest that can be driven into hardwoods without excessive bending. This size is sufficiently strong to resist the internal fibre strains during the seasoning process of the timber without displacing any more wood than is necessary.

### Economies of Anti-Splitting Devices

A tie which is split when put in the track is apt to split more under the impact of traffic. The extent to which it will be affected is dependent upon the axle loads, the volume of traffic and such service conditions as ballast, roadbed, rail and tie plates. While a tie is under traffic there is no influence that conceivably would cause a split in it to close. Splitting begins almost entirely in the seasoning process, during which time a crosstie will lose 25 to 40 per cent in weight and 10 to 18 per cent in volume.

At present practically all railroads are giving every tie the best possible chance to render its fullest service. This is being done by treatment, pre-ading and boring, careful and skilful handling and the use of good ballast and heavy rail. By this process, the life of ties has been increased from about 8 years to more than 25 years, or in excess of three times. I think it conserva-

<sup>3</sup> Chief Tie Inspector, Wabash, St. Louis, Mo.

<sup>4</sup> Assistant Engineer, Kansas City Southern, Kansas City, Mo.



tive to predict that ties being placed under present conditions will give an average life of 30 or 35 years. If a tie in the track costs \$1.75, including the labor of placing, which is a fair average, and assuming a life of 30 years, the cost per year would be 5.83 cents. An iron can be applied in each end of a tie at a cost of about 2.5 cents, or two irons in each end for about 5 cents. If the application of one iron in each end increases the service of the tie only six months, and if two irons in each end increases its life a year, the money is well spent.

The proposition that every hardwood tie be equipped with irons is sure to be met with at least three objections as follows: (1) That many irons would be wasted by being applied to ties not needing that type of protection; (2) that it is impossible to determine the position in which an iron should be placed until the checking tendency of the tie has manifested itself; and (3) that driving an iron in a tie that would not have split naturally is apt to cause it to split.

In answer to the first objection, the number of ties which would not be benefited would be relatively small. As to the second objection, if men of experience use proper intelligence in the selection of the shape of iron and its location in the tie, ineffectiveness will largely be overcome. The third objection loses much force upon investigation. A split might, in rare cases, be caused by an iron, but if only the recommended shapes are used, the cases where they cause splits will be so few that this objection becomes of the second order of importance.

#### Conclusions

I offer the following conclusions which, generally speaking, are in line with the recommendations of the Tie committee of the A.R.E.A.

1. Both the producer and user should be interested in the application of anti-checking devices.
2. Every tie made from hardwoods or from broad-leaved woods should be protected by at least one iron in each end.
3. The three shapes of irons mentioned have important and specific uses.
4. The waste of irons by improper placing can be minimized by the intelligent application by experienced men.
5. Irons should be applied as soon as feasible after the manufacture of the tie and not later than when received at the storage yard for seasoning.
6. Economy results from the proper and generous use of irons.

## Does Tapping Affect Tie Timber?

By C. S. Burt<sup>3</sup>

Does the tapping of pine trees impair the resistance to decay of crossties cut therefrom? Some of the oldest pine mills in the south which have worked their timber for years, backed by experiments conducted within their own organizations, are strong in their conviction that bled timber is on a par in every respect with timber that has not been tapped. It is freely conceded, however, by these concerns that a certain amount of damage or loss occurs from this operation through the production of lower grade material cut just beneath the scars or faces, because of pitchy or very resinous streaks. There are other mills in the same territory with long years of continuous operation which are equally firm in their views that bled timber for use as crossties or structural material has been considerably damaged by being tapped, both as regards strength and resistance to decay.

<sup>3</sup> Superintendent Ties and Treatment, Illinois Central, Grenada, Miss.

The Forest Products Laboratory, Madison, Wis., has conducted many experiments in an attempt to clarify this situation. The following appeared in Forest Circular No. 12, issued in 1906.

"The results prove conclusively (1) that bled timber is as strong as unbled if of the same weight; (2) that the weight and shrinkage of the wood is not affected by bleeding; (3) that bled trees contain practically neither more nor less resin than unbled trees, the loss of resin referring only to the sapwood and therefore, the durability is not affected by the bleeding process."

The Illinois Central has from time to time used rather large quantities of untreated heart pine crossties produced from timber that had been tapped. We have thus far failed to develop any substantial evidence showing that damage to the timber really occurs, either as regards tensile strength or resistance to decay.

## Relative Merits of Different Woods for Crossties

By W. R. Goodwin<sup>4</sup>

At least 50 different varieties of woods are suitable for crossties. Their relative merits for this service depend on their strength, the locality in which they are to be used, the traffic they will carry, the mechanical protection provided, the character and amount of ballast and whether they are to be given preservative treatment or are to be used untreated.

To be suitable for crossties, a wood must have sufficient strength as a beam to support the rails, it must have compressive strength parallel to the grain to hold the spikes and must be hard enough to resist rail and plate wear. Although the serviceability of any wood for ties is dependent on its mechanical properties, some properties or combinations of properties are often brought into play, concerning which no adequate data are available. For this reason, the values presented in tables do not necessarily give a final measure of the exact suitability of various species of woods for crossties. They should rather be regarded as indicative of their utility. Service records, where available, are of great value in appraising the relative behavior of woods under a given set of conditions. Such records sometimes show that species with a fairly low composite tie-strength value surpass some of those with higher ratings.

To develop the full mechanical life of most crossties, it is necessary to give them preservative treatment. A comprehensive series of tests of preservatives which were started on the Chicago, Burlington & Quincy in 1909 shows that, compared with an average life of 5.78 years for untreated ties, the same woods when creosoted have service lives ranging from 19 to 26 years. The same tests show that treatment with zinc chloride extends the life to from 14 to 19 years. Similar records can be produced by other roads.

Careful consideration should be given to the relative merits of the different woods available, the intensity of the traffic they are to bear and methods of protection against wear and decay. If this is done, it seems reasonable to predict an average tie renewal of 100 ties to the mile. For the 27 roads reporting to the Tie Service Records committee of the American Wood-Preservers' Association, this will mean a reduction of nearly 15,000,000 ties a year.

<sup>4</sup> Engineer of tie preservation, Minneapolis, St. Paul & Salt Ste. Marie, Minneapolis, Minn.



The Thirty-Seventh Annual Meeting of the Signal Section in Session at New York

# Signal Section Meets in New York

Highway crossing protection and direction of train movements  
by signal indication were important  
subjects discussed

THE use of modern signal facilities as a means of reducing operating expenses, and improvements in automatic highway crossing protection, were two of the more important subjects discussed at the annual convention of the Signal Section, A.R.A., at the Hotel Roosevelt in New York on Tuesday and Wednesday of this week. P. M. Gault, signal engineer of the Missouri Pacific, presided as chairman, the meeting being attended by 350 members and 43 guests.

Many of the committee reports presented at this convention were, with slight revisions, the same as those considered at the 1930 autumn meeting, no new advance notice being published prior to the 1931 convention. Therefore, as extended abstracts of the two more important reports were published in the *Railway Age* for September 20, 1930, the reader is referred to that issue, and emphasis is here given to the new material and to the discussion presented at the recent convention. The reports on the economics of signaling and on highway crossing protection are given in abstract, while the remaining reports, which were of a more technical nature are mentioned only briefly.

At the close of the session on Wednesday, the secretary announced the election of officers for the coming year as follows: Chairman, A. H. Rice (D. & H.), first vice-chairman, H. H. Orr (C. & E. I.), and second vice-chairman, J. E. Saunders (D., L. & W.).

## Denney Addresses Convention

In opening the meeting, Chairman Gault introduced C. E. Denney, president of the Erie, who entered railway service through the signal department, being at one

time signal engineer of the New York Central, Lines West, and president of the Railway Signal Association for the year 1911.

Mr. Denney opened his remarks by stating that he had been intimately connected with the signaling field during the period from 1899 to 1916, and that since that time had followed the progress of signaling closely. He expressed the opinion that the improvements made in signaling were the most interesting of all railroad developments during the last 30 years. In addition, he predicted further developments in signaling which would bring about decided benefits in the operation of trains, with special consideration to higher train speeds.

As a railroad president, Mr. Denney said that he was in favor of conventions as the best means of exchange of opinions and the development of specifications for the benefit of all railroads. He suggested that the younger men in the signal departments be trained to study signaling as a means of expediting train movements, and said that with this training they will be equipped for promotion to the operating departments. He said the opportunity for advancement in the railroad field today was as good as ever. In closing, Mr. Denney pointed out that as signal construction is at a low ebb, now is a good time to make operating studies to determine the practicability of improving train operation by installing signaling facilities.

## Chairman Gault's Address

The annual chairman's address, presented by Mr. Gault, included an excellent discussion of the problems before the Signal Section. In order to save time on the



convention program, the complete text of the address was distributed to the members in mimeograph form, while Mr. Gault gave only a summary in a few words.

In brief, Mr. Gault pointed out that the signaling field is progressing in an orderly and definite way to eliminate non-essential apparatus and to secure the most efficient service from the remaining equipment as well as that being developed. He granted that the signal engineers and the Signal Section had been accused of dealing too much in technical details, but pointed out that only as a result of this technical study could the specifications of the Signal Section have been developed. In addition to continuing this work, he suggested that signal officers direct their efforts toward the solving of operating problems. Mr. Gault further suggested that men being trained in the signal departments should study the economic factors of railroading and methods of expediting train movements safely, thereby making them qualified for positions in the operating departments.

#### Borland Comments on Forestalling Feature

In the discussion on the subject of automatic train control and cab signals, W. P. Borland, director of the Bureau of Safety of the Interstate Commerce Commission, offered a few words of caution which, in brief, were as follows: Investigation of the causes of certain recent train accidents has established the fact that the accidents were caused by enginemen forestalling the automatic brake application while traveling at night speeds. Something must be done about this matter. It should be remembered that the I. C. C. changed its specifications to permit this permissive feature, at the request of the railroad, the Commission stating at that time that the change was made on trial. Mr. Borland warned the roads that they may lose this privilege of using the permissive feature if it is abused too much.

Further, Mr. Borland pointed out that many roads are not observing standard code A. R. A. Rule 285 of the 1928 edition, which requires the enginemen to reduce the speed of his train to medium speed at a caution signal, this wording being in contrast to that of the previous rule requiring the enginemen to approach the next signal prepared to stop. He said that these two matters are closely related in that the use of the forestalling devices must be surrounded with suitable safeguards such as the requirement that the enginemen must be taking action to comply with the present standard code Rule 285 before he is permitted to operate the forestalling device.

As one of the features of the Monday session, Chairman Gault called attention to the fact that one of the oldest members of the Signal Section was in attendance, and that this man, B. B. Adams, associate editor of the *Railway Age*, had been connected with the development of signaling and the old Railway Signal Association since 1895. He pointed out that Mr. Adams had served as secretary of the Association in 1903 and 1904, and that in addition, he had written one of the early books on block signaling and had served as a member on the Block Signal and Train Control Board, a temporary body established by the I. C. C. in 1907 to investigate these subjects. Mr. Adams recently celebrated his eightieth birthday, at which time greetings were sent to him by the Signal Section. When called upon, Mr. Adams made a few brief remarks of appreciation.

## Benefits of Signaling

J. E. Saunders, signal engineer of the Delaware, Lackawanna & Western, as chairman, presented the report of

the Committee on Economics of Signaling, which included data on four installations where train movements are directed by signal indication, and three papers on interlocking economics, as well as on comparisons of operating results before and after certain improvements were made in signal facilities.

#### Train Operation by Signal Indication on N. Y. C.

The New York Central, on July 25, 1927, placed in service a centralized traffic control system for train operation by signal indication on a 40-mile section of track between Berwick, Ohio, and Stanley. The installation covers 37 miles of single track and 3 miles of double track, all tracks being signaled in both directions. The traffic consists principally of the movement of coal northward and of empties southward, in addition to 10 to 12 high-speed passenger trains and 2 local passenger trains. The movement totals about 18 to 20 freight and 12 to 14 passenger trains per day. Of the 20 freight trains, approximately 15 are loads northbound and 5 are empties southbound.

The centralized traffic control system permitted the elimination of a large number of train stops, which contributes to the reduction in running time and the ability to establish or change meeting points quickly, thereby reducing delays. As the grade is practically 0.2 per cent against southbound trains over the entire district, the elimination of stops on the grade made it possible to increase the tonnage of these trains, although there has been no change in the class of power. (For further details of this installation see the *Railway Age* for August 20, 1927.)

A study was made of the train operation for February, 1929, after the installation had been in service for about eight months, as compared with the operation for February, 1927, prior to the installation of the new system. The tabulation in the economic statement of this study, as included in the report of the committee, showed that there was a decrease of 26 per cent in train-hours, a 36 per cent increase in freight-train speed and a 39 per cent increase in gross tons per train-hour. The centralized traffic control system cost \$455,000 and track changes and additional sidings cost \$84,200, making a total outlay of \$539,200. The annual gross saving, totaling \$180,070, includes such major items as \$92,534 on account of reduction in train delays and \$26,950 on account of reduction in the number of block and telegraph offices. The annual expense on account of the new facilities is \$51,552, leaving \$128,518 as the total net saving, which is equivalent to 24 per cent over and above interest charges. If consideration is given to the fact that second tracking has been postponed on account of the centralized control, the annual return on the investment is increased to 65 per cent. It is of importance to note that the percentages are very close to the estimates brought out by the studies made prior to the installation.

#### A Recent Study on the P. M.

On the Pere Marquette, centralized traffic control was installed in 1928 on a 20-mile section of single track between Mt. Morris, Mich., and Bridgeport. A study was made recently to determine: (1) The actual time savings with the various densities of traffic, and the total time savings for the year. (2) How closely these results could have been predicted from an analysis of train records, and by graphic re-dispatching for periods before the installation. (3) The financial savings of the centralized traffic control system. (4) Financial comparisons with other methods of operation.

In determining the actual time saved for the year and

with the various densities of traffic, a study was made of 61 days in each of the two years preceding the installation and in the year following. In order to secure days with light and heavy traffic, as well as an equal number of days in the same season of each year, every sixth day in each of the three years was chosen.

The committee report included a tabulation and extended explanation of this study, the result, in brief, being that there was a 21 per cent decrease in train-hours, a 21 per cent reduction in the running time, and a 26 per cent increase in train speed, which was increased from 20.2 to 25.5 miles per hour.

In order to make a comparison between the predicted and the actual time saved, 30 days were chosen at random in the year previous to the installation and the trains were graphically re-dispatched to secure the anticipated performance under the proposed operation. The number of actual train-hours saved was 1,263 per year and the number of minutes saved was 12.70 per train; the predicted time saved, to compare with this, was 743 train-hours per year and 7.46 min. per train, or 61 per cent of the actual time saved.

The tabulation of the financial comparison of train operation and the previous train order method, and with the centralized control as included in the report, showed a saving of \$19,035 for the new system, this saving being based on the elimination of delays, figuring the cost of a train-hour at \$15. This saving represents a return on the investment, over and above interest and maintenance, of 18 per cent on the cost of the new system.

#### **Train Operation by Signal Indication on the B. & O.**

Members of the committee inspected an installation of color-position-light signals and remote control switches between Grafton, W. Va., and Parkersburg, a distance of 102 miles, of which 89 miles is single track and 13 miles double track, and upon which train operation is governed by signal indication. The ruling grades vary from 0.96 to 1.47 per cent, and the tunnels, of which there are 23, are from 300 ft. to 2,710 ft. in length. The traffic includes 18 high-class passenger and 22 freight trains each day.

Previous to the installation of this system, trains were operated by train order and time tables. Now trains of every class are moved by signal indications without train orders and with a marked increase in operating efficiency. The train orders issued have been decreased approximately 1,000 per month. (For a detailed description of this installation, see the *Railway Age* for August 31, 1929.)

#### **Semi-Automatic Block Signals and Remotely-Controlled Switches on the C. & O.**

The Chesapeake & Ohio installed, on a five-mile section of single track between Brighton, Ohio, and Cheviot, an automatic block system with semi-automatic signals and remotely-controlled switch-operating mechanisms for the operation of the switches at the ends of the siding at Brighton. The switches and the signals at both ends of this siding, also the first eastbound and last westbound signal at Cheviot, were placed under the control of the operator at Brighton.

Before the new system was placed in service, manual block signals were in use. On account of the heavy down grade and restricted view of the engineman, all eastbound trains, including the light pusher engines from Cheviot to Brighton, were operated under absolute block and, as this spaced trains about 4.5 miles apart, delays were unavoidable. Under the new system, with three blocks, a large part of this delay was eliminated by permitting eastbound trains to follow under close headway

under the indications of the signals. A study of train operation for one month before and one month after the installation shows that the improvement in operation resulted in an annual saving of \$26,209, or a return on the investment of 101 per cent.

#### **Automatic Block System Replacing Manual Block on M. P.**

An automatic block system was installed to replace manual block signals on the Arkansas division of the Missouri Pacific, including 216 miles of single track and 110 miles of double track. Either-direction operation has been provided for the double-track sections from Bald Knob to Little Rock, 57.5 miles; Little Rock to Benton, 23 miles; and Clear Lake Junction to Texarkana, 9.9 miles. (A description of other signaling and interlocking facilities on these divisions as given in the remainder of this report was also included in an article in the *Railway Age* for January 26, 1929.)

A comparative study of the through freight-train movements before and after the signal installation shows that a saving of 24.4 min. southbound and 63.7 min. northbound has been effected for the average through freight-train movement between Little Rock and Texarkana. Before the signal installation, the average train load from Little Rock to Texarkana was approximately 1,840 tons. Without any increase in power, this train load has now been brought up to approximately 2,000 tons, an increase of about 160 tons or 8.7 per cent for the average through freight train. This means that the cost of running one train out of 12 has been saved. Owing to the installation of remotely-controlled switch-operating mechanisms, 32 operator positions have been abolished on the territory, Poplar Bluff to Texarkana. Recently three cases of broken rails were detected by signals.

#### **Consolidation of Interlockings on N. C. & St. L.**

Prior to 1928, two all-electric interlockings were located at Howell, Ga., tower No. 2 being about 1,400 ft. from tower No. 3. Six operators were employed, three at each tower. At a site about halfway between the two towers, a third story was added to an existing building, at a cost of \$2,489, and the machines in towers No. 2 and 3 were moved to this new location. The consolidated plant consists of 107 levers with 95 functions and 12 spare spaces, operating 31 switches. The cost of the consolidation was \$10,057 and the net saving is \$4,995 annually, which is equivalent to an annual return on the investment above interest charges of 49.6 per cent.

#### **Consolidation of Interlockings on the Pennsylvania**

Two mechanical interlockings with power signals were located at Aynes, Ind., and Kouts, about four miles apart, on the Pennsylvania. At the Kouts interlocking two main tracks cross the Erie and two sidings extend to Aynes, where they connect with the two main tracks. Six operators were employed, three at each tower. The two towers were combined and electric switch-operating mechanisms installed at Aynes and controlled from Kouts.

The changes cost \$24,802 and the saving in wages on account of a reduction in the number of levermen was \$6,110. After deducting the annual expenses, charges, etc. the net saving was \$5,890 annually, which is equivalent to an annual return on the investment over and above interest charges of 23.7 per cent.

#### **Comparison of Operating Results**

Included in the committee report was a complete explanation of recommended methods of comparing operating results before and after making improvements



in signaling facilities. The unit, gross ton-miles per freight train-hour, was taken as the "measuring stick" on a typical division 100 miles long, on which 20 freight trains, each handling 1,000 tons, travel at an average speed of 10 m.p.h. Other items in the tables, such as train-hours per day, tons per day, and gross ton-miles per day, are computed from the above data.

The report included seven tabulations to show the variations in operating results when certain values are

Comparison of Operating Results Before and After  
An Improvement in Signal Facilities

Tables	Trains per day	SUMMARY Road time per train	OF TABLES Train speed m.p.h.	Tons per train	Gross ton miles per train hour
A	20% i	20% d	25% i	20% i	25% i
B	20% i	20% d	25% i	20% i	50% i
C	20% i	20% d	25% i	20% i	25% i
D	20% i	20% d	25% i	20% i	50% i
E	20% i	20% d	25% i	20% i	20% i
F	20% i	20% d	25% i	20% i	20% i
G	20% i	20% d	25% i	20% i	20% i

Note: Where percentages are omitted, the "before" and "after" figures are identical, there being no increase or decrease.  
d = decrease. i = increase.

adopted for the several factors mentioned. A summary of the tables shows the effect of decreased road time, increased train speed, increased tons per train and increased trains per day on the output of gross ton-miles per train-hour.

## Other Reports

The Committee on Signaling Instructions, A. Vallee (D. & H.) chairman, submitted instructions for installing and handling caustic soda batteries, for setting time releases applied to signal apparatus, and for inspecting and testing direct-current relays. For several years this committee has been working on the preparation of a book for the education of signal department employees, entitled "The Principles and Practices of American Signaling," of which 10 chapters are complete and ready for distribution. As a part of the present year's work, the committee has completed Chapter XVI—Interlocking.

The Committee on Interlocking, E. T. Ambach (B. & O.) chairman, submitted revisions of four specifications and three new specifications. The revised specifications related to electric-motor switch-operating mechanisms, interlocked circuit controls, electric locks, and time releases. The new specifications included car retarders, centralized traffic control systems, centralized traffic control machines, and requisites for signaling over spring switches. The Committee on Signaling Practice, W. M. Post (Penn.), chairman, presented three sets of requisites defining definitely the functions of and protection to be afforded by each class of signaling under discussion, including automatic block signals, manual interlocking with switches and derails, and centralized traffic control.

The Committee on Chemicals, I. S. Raymer (P. & L. E.) chairman, presented a new specification on pin-type porcelain insulators, and two revised specifications on transformer oil and cylindrical dry cells. In addition, it was recommended that the specification for petroleum asphaltum to protect insulated wires in trunking, be removed from the Manual. The Committee on Direct-Current Automatic Block Signaling, E. N. Fox (B. & M.), chairman, presented a report including a form for recording d-c. track circuit tests, a set of curves to illustrate the use of recording meters for track circuit tests, and three new specifications including plug-type rail bonds, track circuit connectors, and relay contact post designation plates.

The Committee on Designs, H. G. Morgan (I. C.), chairman, presented two revised drawings, 11 drawings

of obsolete materials for removal from the Manual and 6 new drawings showing various types of instrument cases and mountings for light signals. The Committee on Alternating-Current Signaling, W. F. Follett (N.Y., N.H. & H.), chairman, presented a revised specification for line transformers and a new specification for ground apparatus for lightning arresters. The Committee on Overhead and Underground Lines, G. H. Dryden (B. & O.), chairman, presented revised specifications on lead-covered cable, armored submarine cable, and double-braided weather-proof copper-covered steel line wire. The most important items in the cable specifications were the amount and chemical properties of the insulation.

## Discussion

The report of the Committee on Economics of Signaling was presented by J. E. Saunders (D., L. & W.), chairman, who pointed out several opportunities of making decided savings by making comparatively small expenditures. For example, one road invested \$150 for a machine for marking tags used on a signal construction program for one year, during which time a saving of \$2,472 was accomplished solely by the use of this machine. He stated that during the last five years over 230 automatic interlockings had been installed, the savings being accomplished ranging from 40 to 170 per cent on the investment required in different instances.

Several roads are testing the use of button type reflectors installed in place of the roundels in switch lamps, the respective color indication being given by the reflection of light coming from the headlight of an approaching locomotive. As the light in the switch is eliminated, the economies are self-evident.

Mr. Saunders then introduced B. J. Schwendt (N. Y. C.), sub-committee chairman, who reviewed briefly some of the reports and then gave some recently compiled data with reference to the centralized traffic control installation on 43 miles of single track between Kansas City, Kan., and Atchison on the Missouri Pacific. This installation has now been in service about 16 months and the results show that the freight train hours have been decreased 32.2 per cent, and that 1.4 minutes have been saved per freight train mile.

C. A. Taylor (C. & O.) then presented the report on the Consolidation of Interlockings, which is summarized as follows: Two plants near Oakdale, Pa., on the Pennsylvania, were consolidated with a saving of 67 per cent annually on the amount charged to capital account and 42 per cent on the total cost. At another point on this road where two plants were consolidated at a cost of \$2,080 to capital account, a saving of \$6,000 annually was effected, this being equivalent to 275 per cent on the charge to capital account and 101 per cent on the total cost.

As a part of the committee report, E. H. Thornberry, chief engineer of the Peoria & Pekin Union, presented a paper explaining an installation of centralized traffic control recently installed on that road. A brief summary of the paper follows:

The installation extends over 7.6 miles of line, including 16.6 track miles. Twenty power-operated switches and 34 signals are controlled from the machine in the dispatcher's office. The P. & P. U. is primarily a terminal property, being used by trains of 10 carriers. The scheduled trains include 34 first class and 23 second class trains and, in addition, there are many light engine and transfer train movements, totaling about 165 train movements daily. The trains are bunched in three peak periods during the day, 6 a.m. to 8 a.m., noon to 4 p.m., and 6 p.m. to 9 p.m.

The railroad was faced with the necessity of replacing two interlockings or installing centralized traffic control. Decision was made in favor of the latter, the General Railway Signal Company's latest system being installed. The savings in wages resulting in the closing of towers and block offices results in an annual saving of \$19,347, which is equivalent to 20 per cent on the investment. The saving in train hours and other items has not as yet been determined, but it is expected that it will increase the above figures decidedly.

#### Discussion on Signaling Practice and Train Control

W. M. Post (Penna.), chairman of the Committee on Signaling Practice, presented the report and introduced G. E. Ellis (A. R. A.), who presented the report on automatic train control. No new orders have been issued by the Interstate Commerce Commission during the last year, but Mr. Ellis emphasized the thought that the Commission has not abandoned the idea of train control, it being inclined to give the carriers an opportunity to make other improvements which each one may believe more suitable to its needs. Mr. Ellis gave a detailed report of the status of the train control installations now in service, stating that for the year ending June 30, 1930, the total train mileage over automatic train control territory was 176,077,792, and the total number of operations 178,065,779. This, he pointed out, indicates that the performance of train control is equivalent to that of our best signal installations, both as to restrictive and false proceed failures.

A. H. Rudd (Penna.) then presented a brief report on continuous cab signals, stating that this type of protection is coming to the front rapidly. He then presented a set of tentative specifications and requirements for continuously controlled automatic cab-signal systems, without automatic train control, issued by the Bureau of Safety, Interstate Commerce Commission, as information only and suggestive of what may be desirable in the form of specifications and requirements for such systems. The suggestions made by the I. C. C., with the omission of definitions, are included in the following:

#### Specifications and Requirements for Continuously Controlled Automatic Cab-Signal Systems

(9) The purpose of these specifications is to prescribe essential features involved in the design, construction, installation, operation and maintenance of automatic cab-signal systems of the continuously controlled type, without automatic train control.

(10) The automatic cab-signal system shall function to display a cab-signal indication which corresponds constantly with conditions in advance in the controlling section.

(11) The automatic cab-signal system shall be so arranged that a change of conditions affecting train movement, which occurs within braking distance in advance, will result immediately, regardless of the location of the locomotive in the controlling section, in a change of cab-signal indication corresponding with these changed conditions.

(12) The automatic cab-signal system shall be so arranged that when a locomotive enters and is within a block in which there exists a condition causing a restrictive indication, the cab signal will display the most restrictive indication required by that condition.

(13) The automatic cab-signal system shall be so arranged that when the cab signal changes to display a more restrictive indication, an audible cab indicator will sound and continue to sound until acknowledged.

(14) The automatic cab-signal system shall be so constructed that it may be operated with or without fixed signals. When operated with fixed block or interlocking signals, it shall be so interconnected with the fixed signal system that, so far as practicable, the cab signal will display indications consistent with the indications of the fixed signals, except when a fixed signal displays a less restrictive indication than is required or warranted by existing conditions.

(15) The cab signal shall be plainly visible to members of the locomotive crew when they are in their accustomed stations in the cab.

(16) The cab indicator shall have a distinctive sound which will be clearly audible to members of the locomotive crew under all operating conditions when they are in their accustomed stations in the cab.

(17) The automatic cab-signal system shall be so constructed that the cab signal will, so far as practicable, display its most restrictive indication if an essential part fails or is removed, or if a break, cross or ground occurs in electric circuits, or, furthermore, in case of a failure of energy.

(18) The apparatus shall be so constructed that proper operative relation between the parts along the roadway and the parts on the locomotive will be assured under all conditions of speed, weather, wear, oscillation and shock.

(19) The apparatus shall be so constructed as not to interfere with the application of the brakes by the operation of the engineman's brake valve, or to impair the efficiency of the air brake system.

(20) The apparatus shall be so constructed that it may be applied and be operative when the locomotive is running forward or backward.

(21) The apparatus shall be so constructed that it will operate under all weather conditions which permit train movements.

(22) The apparatus shall be so constructed as to conform to established clearances for equipment and structures.

(23) The apparatus shall be so constructed and installed that it will not constitute a source of danger to trainmen, other employees or passengers.

(24) The apparatus shall be so constructed, installed and maintained that it will be safe and suitable for service. The quality of materials and workmanship shall conform to this requirement.

A. N. Mills, assistant director, Bureau of Safety, explained that these specifications had been drawn up in consultation with representatives of all roads now using continuous cab signals in connection with train control, and pointed out that the specifications are tentative only and have no official status unless and until they are included in a hearing before the I. C. C. He said that, in the meantime, suggestions and criticisms are welcome.

#### Discussion on Highway Crossing Protection

A. H. Rudd (Penna.), chairman of the Committee on Highway Crossing Protection, gave a brief account of the actions of the various bodies involved in producing the new standards for highway crossing protection as recommended by the Joint Committee on Highway Crossing Protection of the A. R. A. He explained that the representatives of the Signal Section on this joint committee had assisted in preparing the new standard drawings, which had been adopted by the A. R. A. at a meeting in Chicago in May, 1930. These same standards were adopted by the Engineering Division, A. R. A., that is, the American Railway Engineering Association, at its annual convention in March. Reference to this action is given on pages 528-D40 and 528-D41 of the *Railway Age* for March 1. For the advance information of the Signal Section, this report was published in the April issue of *Railway Signaling*.

Mr. Rudd then explained the changes required in the existing Signal Section requisites to permit the adoption of these new standards and made a motion that these changes be adopted.

W. F. Zane (C., B. & Q.) stated that in his opinion this was not the time to adopt new specifications that would require additional apparatus, and made a motion to the effect that the Signal Section should reject the proposed specifications. Mr. Zane's idea was that the Joint Committee should not concern itself with specifications but should work to build up national sentiment for a standard by contacting with various state and municipal bodies, automobile clubs, etc.

Mr. Rudd explained the fact that the proposed standards had been developed through the National Conference on Street and Highway Safety, which includes 200 representatives from all interested bodies. He



pointed out that the present types of signals are not affording adequate protection due to a lack of understanding on the part of automobile drivers.

C. A. Dunham (G. N.) explained the movable disk type of stop sign used in conjunction with flashing light signals on the roads throughout the Northwest. He objected to Mr. Zane's motion and commended the position taken by the committee.

Mr. Rudd explained that the rotating disk stop sign with flashing light signals met with the standards proposed, providing the letters are red.

After an extended argument by several members, Mr. Zane's motion was put to a vote and was lost. Mr. Rudd then made a motion that the Signal Section approve the new drawings for submission to letter ballot for inclusion in the Manual. The motion was carried.

## Freight Car Loading

WASHINGTON, D. C.

**R**EVENUE freight car loading in the week ended May 2 amounted to 775,291 cars, an increase of 16,019 cars as compared with the previous week. This was 167,383 cars less than the loading in the corresponding week of last year and 276,644 cars less than the loading in 1929. Decreases as compared with both years were reported from all districts and as to all commodity classifications. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading			
Week Ended Saturday, May 2, 1931			
Districts	1931	1930	1929
Eastern .....	187,968	220,015	248,454
Allegheny .....	156,238	195,550	220,304
Pocahontas .....	42,557	53,890	56,045
Southern .....	119,123	137,678	147,662
Northwestern .....	93,425	132,229	159,250
Central Western .....	109,793	128,746	142,879
Southwestern .....	66,187	74,566	77,341
Total Western Districts .....	269,405	335,541	379,470
Total All Roads .....	775,291	942,674	1,051,935
Commodities			
Grain and Grain Products .....	36,879	39,067	38,784
Live Stock .....	23,828	25,882	28,317
Coal .....	122,298	148,115	156,002
Coke .....	7,510	10,909	12,350
Forest Products .....	33,767	57,046	68,653
Ore .....	10,984	32,396	66,512
Merchandise L.C.L. ....	227,131	250,862	265,585
Miscellaneous .....	312,894	378,397	415,732
May 2 .....	775,291	942,674	1,051,935
April 25 .....	759,272	906,879	1,051,885
April 18 .....	760,002	892,706	1,005,880
April 11 .....	737,934	911,316	973,152
April 4 .....	728,511	908,059	958,225
Cumulative total, 18 weeks.....	13,027,049	15,830,818	17,194,605

The freight car surplus for the week ended April 23 averaged 614,228 cars, a decrease of 8,050 as compared with the week before. The total included 285,945 box cars, 259,505 coal cars, 29,220 stock cars, and 16,094 refrigerator cars.

### Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended May 2 totaled 53,089 cars, an increase over the previous week of 2,721 cars but a decrease of 5,858 cars from the same week last year.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
May 2, 1931.....	53,089	31,385
Apr. 25, 1931.....	50,368	30,896
Apr. 18, 1931.....	48,726	29,138
May 3, 1930.....	58,947	37,075
Cumulative Totals for Canada		
May 2, 1931.....	855,014	513,952
May 3, 1930.....	1,023,610	659,611
May 4, 1929.....	1,134,166	782,841

## Status Quo Recommended for Lake Cargo Coal Rates

WASHINGTON, D. C.

**A** RECOMMENDATION that the Interstate Commerce Commission adopt a "hands-off" policy as to the controversy over the adjustment of lake cargo coal rates, which has been before it since 1912 and which is credited with having caused the retirement of two of the commission's members as well as the failure of the Senate to confirm the appointment of others, is made in a proposed report by Examiner C. M. Bardwell, made public on May 8. The examiner recommends that the commission permit the maintenance of the "compromise" rates established by the railroads on January 1, 1929, which the commission at that time declined to suspend, by dismissing complaints filed by associations of coal operators in the Pennsylvania, Ohio and Maryland coal districts with a finding that the rates assailed are not unduly prejudicial or unduly preferential. Complainants had charged that they were being prejudiced by reason of the fact that the rates from the southern fields of Virginia, West Virginia, Kentucky and Tennessee, to the lake ports for transshipment beyond, are only 35 cents a ton higher than their rates, although the distances from the southern fields are approximately twice as great.

The commission has at various times taken opposite sides in this great contest among coal operators for the lake cargo tonnage. In 1925 it held the rates to be reasonable but in 1927 reversed itself and ordered a reduction of 20 cents a ton in the rates from the northern fields so that they would be 45 cents, instead of 25 cents, under those from the southern fields. The southern roads retaliated by cutting their rates 20 cents a ton and restoring the old differential. The commission ordered the reduction cancelled but the southern coal operators took the case to court and obtained an injunction. While an appeal was pending in the Supreme Court various rates changes were made in 1928 and the railroads serving the rival fields got together to avoid a rate war and the southern roads increased their rates 10 cents a ton, establishing the compromise differential of 35 cents a ton, on January 1, 1929, which has been in effect since. The present rate from the Pittsburgh district is \$1.46 as compared with \$1.81 from the high volatile southern districts, although from the low volatile district the rate is \$1.96. The Supreme Court then dismissed the case before it as "moot" and the Ohio and Pennsylvania operators last year filed a new complaint.

"It is unquestionably true," said Examiner Bardwell in his report, "that the rate adjustment here assailed is more favorable to the southern operators than would be the case if it were based on distance scales of maximum reasonable rates. It is also probable that if the commission were faced with the task of prescribing maximum reasonable rates from both the northern and the southern fields it would not upon the evidence contained in this record find transportation conditions as a whole so dissimilar as to justify the prescription of a lower level of rates from the southern than from the northern fields. But the charging by the carriers of rates less than reasonable maxima does not necessarily violate the third section of the interstate commerce act.

"As proof that the result of the lake cargo rate adjustment has been actually to injure them and to prefer unduly their southern competitors, complainants point to the fact that since this adjustment was first considered

by the commission in 1912, the tonnage of lake cargo coal from the northern districts has materially fallen off, while that from the southern districts has greatly increased. The movement of lake cargo coal has been affected by many and varied circumstances and conditions making it extremely difficult to determine the underlying causes of tonnage shifts or the relative importance among those causes of freight rate differentials. The proportion of the total tonnage moving from individual districts or groups of districts has been affected by labor conditions, the general industrial situation, the state of the steel industry, car shortages and conditions arising out of the war, including operation of the railroads by the Railroad Administration and the zoning and distribution of coal by the Fuel Administration. The rapid shift of tonnage from the northern to the southern fields, which began in 1924, obviously was not due to the freight differential. Beginning with 1928 a definite swing of tonnage back to the northern districts is shown.

"The interest of the carriers is also an important factor to be considered. In this proceeding, contrary to their position in the last previous case in which these rates were considered, the carriers originating coal in the northern districts join with the southern carriers in opposition to any widening of the differentials. In the exercise of their managerial discretion and under the stress of competition, carriers often establish rates and rate relationships which the commission could not require them to establish. When such rates appear as a whole to be in the public interest, they should not be condemned merely because they do not bear the same relationship to each other as would maximum reasonable rates between the same points."

A table published with the report shows that the percentage of the total lake cargo coal tonnage shipped from the complaining districts was gradually reduced from 71.47 in 1909 and 67.42 in 1912, to 12.04 in 1927, but that it increased to 23.04 in 1928, 29.33 in 1929 and 31.71 in the first nine months of 1930.

## Transport Secretary Advocated by Ripley

(Continued from page 984)

against a project which is as yet only in an experimental stage.

The fourth menace is the development of the public utilities. The present situation is disheartening. But I venture to prophesy that before many years we shall have a distinct activity of the Federal government covering a branch of this service which is now utterly undeveloped. You will probably be told that there is "state" regulation now. But state regulation within each state does not amount to a hill of beans; and there is as yet no inter-state regulation. To my thinking, attention should be directed toward putting such utilities under the same sort of regulation as the railroads. The accounts should be standardized. They should be required to publish such accounts just as the telephone and telegraph companies are.

If we could know, similarly, what is going on in the public utilities, it would be a fine thing for the railroads. As it is, any inquiry is stopped by federal injunctions. There is therefore no way of investigating the relative costs of service for the two industries.

### Situation Desperate but Not Fatal

This brings us to the subject of railroad consolidation as a possible remedy for the distress in which the railroads now find themselves. The situation is certainly most serious. Some large savings banks and insurance companies are

said to be turning their registered bonds into ordinary bonds. Having witnessed the collapse of the stock market they are naturally apprehensive. I think a great deal of this hysteria is uncalled for. The situation is desperate but not fatal. It is no worse than in 1919. And the rejuvenation from 1919 to 1929 was most remarkable. With recuperative power like that, there is no doubt in my mind that when the public comprehends the situation that it will be handled rightly. With a proper response from the carriers, accepting their own share of responsibility we shall see the same recuperative power at work as so often in the past. You will witness something almost unbelievable in the way of recovery.

### Short Lines Keep Consolidation Alive

About this matter of consolidation: There is a great interest in New England and in the trunk line territories in consolidation. This arises from a different reason than in 1920. Then the Congress wanted the Interstate Commerce Commission to be able to regulate rates so that one road should not grow overly fat while another was starving to death under a given schedule. The interest since 1922 has been kept alive by the influence of the short lines. These have a greater influence in Washington than the Pennsylvania, the Union Pacific, and other large railroad corporations. The reason for this is that the directors and stockholders of the short lines, are local people. Local people hold the bonds and manage the property. So that every one of these little railroads has a congressman at Washington who acts as at the end of a wire. If it weren't for the influence of the short lines, Congress would long since have forgotten this subject of consolidation entirely. Consolidation at this time, however, could not be consummated if it had not been for the general industrial depression, even in trunk line territory. For at least two of the big systems, the New York Central and the Baltimore & Ohio have practically fulfilled their destinies. The Pennsylvania and the interests which control the Nickel Plate and the Chesapeake & Ohio would never been willing to sit down once more in counsel had they not been forced to it by the exigency of business depression.

Consolidation at this time is needed in order to help rehabilitate the railroads and to restore public confidence. It will help in two or three ways. First is in the relationship of the carriers to big national shippers. Business is being conducted more and more in units of country wide scope. The individual has little to do with his economic fate today. Neither wages nor profits under existing conditions may be worked out in the same way today as they could in the past. Large companies have the railroads by the throat on account of the huge amount of their tonnage. If the carriers could present a united front, they might be able to cope with such a situation. Such united action is impossible at present with thirty or more railroad companies in the east alone. But suppose there be only four instead of thirty. The chances are that they will be far better able to secure fair treatment.

There is another big advantage of railroad consolidation which is little talked about. That is the economy in doing away with wasteful, roundabout, circuitous routing. I have in mind a report on a suggested consolidation by a firm of experts averring that economies of a large amount would result; but that in addition over a million car miles of waste haulage could be eliminated. With an opportunity to demonstrate what can be accomplished thus by consolidation, the public would be surprised at the effect.

Naturally, there are some things the railroads must do, in addition, in order to meet the existing crisis. They are not blameless. I am no apologist for the railroads. They must discipline their own membership and create a solidarity of opinion among themselves. F. J. Lisman of New York suggests that they should do as is done in the radio industry and in the motion picture industry—appoint an umpire to straighten things out within the industry. Suppose we had these four presidents and all but one agreed on a certain policy—that one could then be forced to go along. The umpire would decide. I would like to amend this proposal. The functions of the Interstate Commerce Commission should be divided as between these which are judicial and those which are administrative. The administrative duties should be in the hands of a new member of the President's Cabinet, to be called the Secretary of Transportation. This Secretary should be the umpire for the railroads. This merely revives the plan proposed by the railway executives themselves in 1920.

If this were done, if good times return; and if competitors are put where they should be, as common carriers; I prophesy that a way out of the prevailing distress will be found. And the recovery will be even more marked than it was in the years subsequent to 1920.



## Looking Backward . . . New Books . . .

### Fifty Years Ago

The Chicago, Burlington & Quincy will commence running its trains to and from the new Union Passenger station along the south branch of the Chicago river at Chicago on June 15, instead of entering the city over the tracks of the Illinois Central as it has done in the past.—*Railway Age*, May 19, 1881.

During the month of March, 1881, several locomotives on the Ohio & Mississippi [now part of the Baltimore & Ohio] made some remarkable performances. Locomotive No. 109 ran 7,429 miles; No. 60, 7,275 miles, and No. 108, 7,029 miles. Seventeen other locomotives on this road made over 5,000 miles each in March. About a year ago the New York Central reported that one engine made 9,482 miles in a month and during six consecutive months averaged nearly 9,000 miles a month.—*Railway Age*, May 19, 1881.

The switchmen's strike at Chicago, which was inaugurated on May 2, was ended on May 17, by the surrender of the strikers, and the return to work of the greater part of them at the rates offered by the companies. A few of those who have been most active in fomenting disturbance have not been permitted to resume their positions. The rate paid switchmen is now uniform on all roads in the city, being \$70 for day and \$75 for night switchmen, and \$65 for day and \$70 for night helpers. This is a voluntary advance in the case of most of the railroads over the old rate, and is not much less than the men demanded.—*Railway Age*, May 19, 1881.

### Twenty-Five Years Ago

One result of the present tendency toward lower passenger rates, either voluntarily or under legislative compulsion, may be looked for in a heightened interest in and an added impetus to the endeavors to obtain a satisfactory motor car design with which to replace, where practicable, present unprofitable passenger train service. President Hill of the Great Northern sent an expert to Europe several months ago to study the question and recommended a steam car of a flash boiler type using oil as fuel.—*Railroad Gazette*, May 18, 1906

The railway rate bill has passed the ordeal of consideration in the committee of the whole, and Thursday noon it was taken up for final consideration in the Senate. It is likely to be some time before the conference work is completed, and the final text of the bill, as it will carry the President's approval, may not be determined for some days or weeks. The great number of important amendments which have been added by the Senate will make the work of the conference committee very important. The conference report must, in due time, run the gauntlet of the Senate and House, a process which may reopen a new flood of debate on both sides.—*Railway Age*, May 18, 1906.

### Ten Years Ago

Charles T. O'Neal has been appointed receiver of the Fort Smith & Western, with headquarters at Fort Smith, Ark.—*Railway Review*, May 14, 1921.

R. W. Barnes, assistant engineer of the Southern Pacific at Portland, Ore., has been appointed assistant engineer on the Southern Pacific, Texas Lines, at Houston, Tex. W. S. Hanley has been appointed chief engineer of the St. Louis-Southwestern, with headquarters at Tyler, Tex.—*Railway Age*, May 13, 1921.

Hearings before the Senate committee on interstate commerce, pursuant to the Senate resolution directing an inquiry into the general railroad situation, were begun at Washington on May 10. In opening the hearings, Chairman Cummins read into the record statistics showing that while operating revenues have increased since 1913, there has been a greater increase in operating expenses so that for the year which ended on March 1, 1921, the net operating income was only \$2,578,922 compared with \$787,610,435 in 1913. In the latter year the ratio of operating expenses to operating revenues was 69 per cent, while in the year which ended on March 1 last it was 94 per cent.—*Railway Age*, May 13, 1921.

### Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

#### Books and Pamphlets

*A Catalogue of an Exhibition of Memorable Documents in American History From Columbus to Hoover.* "We have selected for this exhibition what we consider foundation documents. We have included only autograph documents . . . reserving for a future exhibition printed Americana. . ." p. iv. Of transportation interest are the Columbus Codex, the original ship papers of the sailors signing on and off for the voyage that discovered Australia, letters mentioning the "wagons" of the Braddock expedition, the documents relating to the various wars, and Caesar Rodney's note on his ride. 107 p. Pub. by The Rosenbach Company, New York City. Apply.

*A Defence of Canada's Wheat Pool—A Reply to Gampell.* The Gampell survey was noted in the *Booklist* for March 7, 1931. 48 p. Pub. by Alberta Wheat Pool, Calgary, Canada. Apply.

*Die Deutsche Reichsbahn und ihre Beziehungen zu ausländischen Eisenbahnen*, by P. Wolf. A concise statement of the relations of the Germany Railways with foreign railways as established by various international agreements, understandings between managements and other arrangements. Appendices give the texts of the principal statutes, business rules and regulations of the international associations and organizations. A valuable reference work for those interested in international economics and traffic. 152 p. Pub. by Verlag der Verkehrswissenschaftlichen Lehrmittelgesellschaft m. b. H. bei der Deutschen Reichsbahn, Berlin, Germany. 9 marks.

*Economic Handbook of the Soviet Union.* A compilation of "significant data in regard to the national economy of the Union of Soviet Socialist Republics." The chapter on transportation includes statistics of railways, highways, air lines, inland waterways and merchant marine. 151 p. Pub. by American-Russian Chamber of Commerce, New York City. \$1.

*Report of the Committee on Main Line Railway Electrification 1931.* Report made to Ministry of Transport by the committee of which Lord Weir of Eastwood was Chairman. Abstracts in *Modern Transport*, May 2, 1931, p. 3-6 with editorial comment, p. 2, and in *Railway Gazette*, May 1, 1931, p. 669-674 with editorial comment, p. 664. 57 p. Maps. Pub. by H. M. Stationery Office, London, England. 3 shillings. Available in this country from British Library of Information, New York City.

#### Periodical Articles

*Accident Report on Scheduled Air Transport Operations for the Last Six Months of 1930.* *Air Commerce Bulletin*, April 1, 1931, p. 483-492.

*Automatic Substations in Transportation Service*, by C. E. Baker. A survey of applications of automatic switchgear in the transportation field during seventeen years. "A total of 624,000 kw. of converting apparatus in transportation service, controlled by General Electric automatic switching equipment, supplies power to 129 railway systems throughout the world. . ." p. 280. *General Electric Review*, May, 1931, p. 280-283.

*Block-signal System of Air-traffic Control Will Receive Tests.* "A block-signal system of airway traffic control, modeled upon the method employed on railroads, will be given a test on the New York-Washington airway in the near future. . ." *United States Daily*, May 9, 1931, p. 1, col. 6.

# Odds and Ends . . .

## A Royal Shop

Considerable privacy surrounds all operations connected with the railway equipment used by the royal family of Japan. The Emperor not only has a private train, but also a private shop where the locomotives and cars for the private trains of the Imperial household are kept and repaired.

## Fashion Note

Passenger trainmen on the Missouri Pacific will keep cool this summer in olive drab uniforms of three-ply, basket weave worsted, much similar in color to the United States Army uniform. Trainmen on the southern lines of the Missouri Pacific donned the new uniforms on April 15, while on the northern lines they will make their first appearance a month later.

## Passenger Coach Retired After 63 Years

The Southern Pacific recently dismantled a maintenance of way service car, Morgan's Louisiana & Texas No. 317, which had a service record of 63 years as a passenger coach. This car, when it was purchased in 1867, from the car building firm of Gilbert & Bush, Troy, N. Y., cost \$3,415.33. After being displaced in main-line service it was assigned to branch-line service until October, 1922.

## Williamson on Monument Commission

President Hoover has appointed Frederick E. Williamson, president of the Chicago, Burlington & Quincy, as a member of the Mount Rushmore National Memorial Commission. This Commission, authorized by Congress, has charge of sculptural work on Mount Rushmore in South Dakota, where Gutzon Borglum is now engaged in carving on the side of the mountain the likenesses of Washington, Lincoln, and Roosevelt.

## Banana Peel Causes Reportable Casualty

Personal injuries caused by banana peels have been the favorite jest of comedians and comic strips ever since the banana was accepted as an edible fruit. But probably one of the first banana peels ever to be involved in a reportable accident on a railroad figured in the death of Louis D. Dixon, a telegraph operator at Indianapolis, Ind., according to a recent Associated Press dispatch. Dixon slipped on a banana peel lying beside the track and fell under the wheels of a freight train.

## More About the Cherokee Strip

TO THE EDITOR:

The item concerning the opening of the Cherokee strip in Oklahoma in the *Railway Age* of May 2 is historic but not quite correct. The date was noon, January 16, 1893, instead of 1892, and at that time our line was finished through to Fort Worth, Tex. The number of stock cars in the special passenger train we ran was 37 instead of 16, and we hauled about 2,500 passengers on it. I was quite familiar with the whole thing because I was one of the passenger traffic men in charge of the train.

J. A. STEWART

Industrial Commissioner, Chicago, Rock Island & Pacific.

## Fox Hunting on Double Track

The Cottesmore Hounds, a famous pack of fox hunters to which the Prince of Wales and Prince George have ridden, faced extinction recently when they pursued the fox down a double track line near Melton Mowbray, England. A freight train was approaching from one direction and a passenger train from the other, and the woman crossing attendant, seeing that the dogs would be run over by the trains if they

continued on the track, flagged the passenger train. The passenger train came to a stop just in time for the passengers and crew to get out of the coaches and drive the pack from the rails in front of the freight train.

## Henry Ward Beecher's Lunch Complaint

Some 50 years ago the Boston & Albany inaugurated a lunch basket system for passengers at Springfield, Mass. With each basket a complaint blank was provided to mollify those who might object to the food or the system. Henry Ward Beecher wrote on a blank: "Complaint: You give us too good a feed for 50 cents."

## The Bankers and Brokers Special

BALTIMORE, Md.

TO THE EDITOR:

To the collection of railroad terms and definitions I should like to add the following:

Bankers and Brokers Special—An extra passenger train returning from a race track, made up of Pullman cars, diner and coaches. The bankers are riding in the Pullmans and the brokers in the coaches.

F. C. LAMMBIN.

## A Civil War Veteran

The "Gouldsboro," relief car ferry operating for the Illinois Central in transfer service on the Mississippi river between New Orleans, La., and McDonoughville saw service as the double-turreted monitor "Chickasaw" under Farragut at the battle of Mobile bay during the Civil War. The "Chickasaw" was built at St. Louis in 1863, and it is recorded that on August 5, 1864, the fire of solid shot from its 11-inch guns brought about the surrender of the Confederate Ram "Tennessee" as its part in the Federal victory at Mobile Bay. After the war it was used as a coal barge at New Orleans and later was reconstructed as a side-wheel steamer for use as a car transfer boat and renamed the Gouldsboro.

## Peculiar Crossing

SAN FRANCISCO, CAL.

TO THE EDITOR:

The enclosed photograph might be of interest. You have shown various combinations of crossings, but if my recollection is correct, not this particular type. This crossing is at California Park in Marin County, California. Originally there was an undergrade crossing of the Northwestern Pacific by the county road. Recently, the state highway was built through this area and an overgrade crossing constructed. As the county road is to be continued in service, both undergrade and overgrade crossings will be continued in use.

W. S. WOLLNER,

General Safety Agent, Northwestern Pacific.



The Multiple Crossing on the N. P.



# NEWS

## New Railway Supply Association Organized

At a meeting held at the Hotel Sherman, Chicago, Monday, May 4, representatives of the railway equipment manufacturers and supply companies, which usually hold exhibitions in connection with the annual conventions of railroad mechanical department officers and supervisors, discussed the unusual situation presented by the fact that most of the associations have definitely cancelled their annual meetings for the present year, or arranged for brief business sessions with no exhibits. In order to work more effectively with the General Committee of the American Railway Association, Mechanical division, in its plans for simultaneous convention dates and a single exhibition open to all, when next these associations meet, a new organization was formed known as the Allied Railway Supply Association, which consists of a consolidation of the following associations: Railway Equipment Manufacturers' Association (formerly meeting with the Traveling Engineers' Association); Air Brake Appliance Association (formerly meeting with the Air Brake Association); Association of Railway Supply men (formerly meeting with the International Railway General Foremen's Association); Boiler Makers' Supply Men's Association (formerly meeting with the Master Boiler Makers' Association); International Railway Supply Men's Association (formerly meeting with the International Railway Fuel Association); Master Blacksmiths' Supply Men's Association (formerly meeting with the International Railroad Master Blacksmiths' Association); Supply Men's Association (formerly meeting with the Car Department Officers' Association).

The following were elected officers of the Allied Railway Supply Association: President, Irving H. Jones, Irving H. Jones Company, Cleveland, Ohio; first vice-president, Louis B. Rhodes, Vapor Car Heating Company, Washington, D. C.; second vice-president, S. A. Witt, Detroit Lubricator Company, Chicago; third vice-president, J. W. Fogg, MacLean-Fogg Lock Nut Company, Chicago; fourth vice-president, C. F. Weil, American Brake Shoe & Foundry Company, Chicago; fifth vice-president, Arthur S. Lewis, Barco Manufacturing Company, Chicago; sixth vice-president, W. A. Champieux, Oxweld Railroad Service Company, Chicago; secretary, F. W. Venton, Crane Company, Chicago; treasurer, G. R. Voyce, A. M. Castle & Co., Chicago.

"Notwithstanding the substantial diversion of railroad tonnage to other transportation agencies, the people must continue for an indefinite period their dependence upon the railroads as the principal and most important transportation agency. A diversion of railroad tonnage to other transportation agencies must inevitably result in an increase in freight rates sufficient to compensate for the lost tonnage, or else a deterioration in service that will be extremely harmful to the public interest and disastrous to long distance shippers of perishable commodities. It is well therefore, for the shipper contemplating the diversion of his traffic from the railroads to other transportation agencies to give due consideration to the possible effect of such diversion upon rates and service."

—From an address by S. T. Bledsoe, chairman of the executive committee and general counsel of the Atchison, Topeka & Santa Fe, before the Pacific Railway Club.

## Safety Program for June

L. G. Bentley, chairman of the Committee on Education of the Safety Section, A. R. A. has issued Circular No. 296, suggesting that safety departments for the month of June concentrate their attention on "Falls of Persons." This is the title which embraces 45 items in the very detailed record of accidents to employees which appears in the annual bulletin of the Interstate Commerce Commission; and this circular quotes in detail these items from the record of the year 1929, in which the total number of employees on duty killed and injured by "stumbling, slipping or falling" was: 167 killed and 6,867 injured in train service accidents and 37 killed and 4,717 injured in non-train accidents; making the total number of employees entered under "falling, slipping or stumbling," 204 killed and 11,584 injured.

The circular contains a half dozen pictures illustrating some of the principal causes which figure in this record. Comments on the figures are followed by a list of ten preventive measures, most of which are obvious to the careful railroad man—provided he considers them. The last three of these items are:

8. When moving about, do so *deliberately and thoughtfully*, avoiding hurry.  
9. Form the habit of lifting the feet when walking along.

10. BE SURE OF FIRM GRIP AND SAFE FOOTHOLD.

## Agreement Reported on Truck Regulation Proposals in Texas

The conference committee of house and senate members of the Texas legislature which has under consideration the several conflicting provisions of the two motor truck regulatory bills, recently passed by the two branches of the legislature, was reported on May 12, to have reached an agreement respecting some of the matters at issue. One of these bills lodges with the railroad commission of Texas enlarged powers in the supervision and regulation of the operation of motor trucks on public highways irrespective of the kind of traffic in which they may be engaged. Both bills limit the load of a truck to 7,000 lb. for cross country movement and 14,000 lb. for short distance movement. Opponents of the bills assert that these and other restrictive measures are such as to practically exclude all motor trucks from the public highways.

The Texas legislature has also passed a bill limiting the load of cotton hauled by one truck to 10 bales in an enclosed body. It requires such trucks to stop at the first compress for compressing of the bales. This measure has not yet been signed by the governor.

## U. S. Experts Defend Montreal Track Elevation

A considerably lower cost for elevated than for depressed tracks was shown in evidence presented at the City Hall in Montreal last week by the Canadian National witnesses in the hearing by the Dominion Railway Board of the application of the city of Montreal against the proposed northeastern belt line project of the railway. Previously the city, in its case, submitted evidence purporting to show the depressed tracks would be cheaper and just as easy to operate in severe winter weather as the elevated lines.

To depress the proposed belt line in the north end of the city would cost \$6,424,959, or \$2,465,659 more than the \$3,959,300 required for the proposed elevation of tracks, according to an estimate filed by the railways with the Dominion Railway Board.

The railroad filed its figures after C. R. Vanneman of Albany, N. Y., former chief engineer of the Public Service Commission of that state, had given his view that, whereas the road is proposing to elevate over five miles of track, he considers elevation of around two miles would be sufficient, with the tracks then to run on the level and highways to be carried over on bridges. Depressed tracks, he ruled out as over-expensive

in cost, difficult of maintenance and impractical of operation.

He was supported in his views as to the preferability of elevated tracks by W. G. Wiggins, of Pittsburgh, Pa., chief engineer, central division, Pennsylvania Railroad, who considered that drainage would be especially difficult problem in maintaining and operating a five-mile depression.

L. V. Morris, consulting engineer of the Long Island took the stand to explain how elevated tracks over his section have not retarded development of fine residential sections. He cited instances where nearby property bought years ago for \$717 sold for \$89,000, after the elevated tracks had been built: while 10 acres bought for \$10,000 have already brought \$600,000 in lots, and the balance is worth \$150,000.

### Wabash Subsidiary Seeks Illinois Highway Certificate

The Illinois Commerce Commission held a hearing on May 6 on the application of the Wabash Motor Transit Company, a subsidiary of the Wabash, for authority to operate motor vehicles between Springfield, Ill., and Danville.

### Freight Claims by Territories

The Freight Claim division of the American Railway Association has divided the freight claim payments for 1930 according to territories, the loss and damage bill for each being as follows:

Eastern .....	\$15,625,490
Western .....	10,812,002
Southern .....	4,940,486
Southwestern .....	3,581,313
Canada .....	958,167
Steamship companies .....	322,182

### Car Hire Case Taken to Supreme Court

The Chicago, Rock Island & Pacific and other roads on May 7 filed in the Supreme Court of the United States an appeal from the decision of the district court which had denied their application for an order setting aside the decision of the Interstate Commerce Commission requiring modifications, sought by the short line railroads, in the rules for car-hire settlement.

### Wage Statistics for February

Class I railways had a total of 1,316,494 employees as of the middle of the month of February, according to the Interstate Commerce Commission's monthly statement of wage statistics. This was a decrease of 17,326 as compared with January, and of 227,823, or 14.75 per cent, as compared with February of last year. The total compensation was \$175,818,130, a decrease of \$37,380,485 or 17.53 per cent as compared with February last year.

### P. & S. Convention Delegates Invited to Club Meeting

Members and guests of the Purchases and Stores Division, American Railway Association, attending the convention to be held May 19-21 at Atlanta, Ga., have been invited to be present at the meeting of the Southern and Southwestern

Railway Club in that city, on May 21. G. E. Doke, president of the Association of Manufacturers of Chilled Car Wheels, will be the speaker at the meeting of the club. In addition to Mr. Doke's discussion of chilled car wheels, the program calls for motion pictures and a banquet.

### Nebraskans Challenge Missouri River Waterway Advocates

Two advocates of improvement of the Missouri river have been challenged by E. P. Ryan of Grand Island, Neb., president of the Nebraska Traffic League, and State Senator Kenneth S. Wherry, republican of Pawnee City, Neb., to meet in joint debate to show how navigation on that river would in any way benefit Nebraska. The challenge was addressed to Arthur Weaver of Falls City, Neb., former governor and president of the Missouri River Navigation Association, and C. E. Childe, traffic manager of the Omaha (Neb.) Chamber of Commerce. The two challengers offer to meet the waterway advocates in debate in five or six different cities.

### Club Meetings

The Southern & Southwestern Railway Club will hold its next meeting at the Ansley Hotel, Atlanta, Ga., on Thursday, May 21, at 10 a. m. G. E. Doke, president of the Association of Manufacturers of Chilled Car Wheels, will present a paper, illustrated by motion pictures, on the manufacture of chilled tread car wheels.

The Toronto Railway Club will hold its next meeting on Tuesday evening, May 19, at the Royal York Hotel, Toronto, Ont. J. B. Cameron, district superintendent of colonization of the Canadian Pacific, will speak on the attitude of railways towards immigration and colonization.

### Curtis, Conductors' President, Dies

Edward P. Curtis, president of the Order of Railway Conductors, died at Kansas City, Mo., on May 7 where he was attending the annual meeting of that union. His death, at the age of 64 years, occurred following a relapse after an attack of influenza. He had been an officer of the brotherhood since 1907 when he was elected vice-president. In February, 1923, he became secretary-treasurer and in July, 1928, he was elected president, with headquarters at Cedar Rapids, Iowa. Prior to his election as a national officer in 1907 Mr. Curtis was active in brotherhood affairs as a fireman, a brakeman and a conductor on the Missouri-Kansas-Texas.

### New Jersey Rate Hearings Resumed

New York civic and business interests began the presentation of testimony designed to preserve the Port of New York as a freight rate unit with the resumption in New York City on May 12 of the Interstate Commerce Commission hearings in the New Jersey-New York lighterage and freight rate case.

Parker McCollister, deputy attorney general of New York, and chief counsel for the New York State Chamber of Commerce and other organizations,

heads the group of defense counsel, which represents leading business interests of the five boroughs, the 70 railroad defendants, and a number of New York State cities. New Jersey has already presented its case, alleging unfair discrimination against the State of New Jersey through free lighterage by the railroads of freight in New York harbor.

### Commercial Stocks of Coal

Commercial stocks of bituminous coal used largely for industrial purposes amounted to 29,500,000 tons on April 1, 1931, according to the quarterly survey just completed by the United States Bureau of Mines, Department of Commerce. In comparison with the amount on hand at the beginning of the previous quarter, this is a decrease of 7,700,000 tons and is the smallest tonnage in storage at any time since 1922.

Exports during the first quarter of 1931 averaged 175,000 tons a week, as against 331,000 tons in the preceding quarter. The weekly rate of consumption within the United States during the first quarter of 1931 amounted to 8,868,000 tons, as compared with 8,987,000 tons in the previous quarter. In comparison with the average weekly rate of consumption during the last quarter of 1930, the rate of home consumption shows a decrease of 1.3 per cent.

### Pennsylvania Provides Freight Loaders

The Pennsylvania has filed with the Interstate Commerce Commission a freight tariff to become effective June 4, under which, at the New York piers of the company, freight heretofore loaded or unloaded by shipper or consignee, and in connection with which there has been much complaint of unfair practices by outside workmen, the railroad company will perform the service for three cents a hundred pounds. The road will assign men to the trucks of shippers or receivers and these men will be responsible to the railroad company. It is expected that other roads with New York freight terminals will take similar action. Longshoremen hired by consignors and consignees have been accused of browbeating shippers who desired to do their own loading or unloading.

### Executives Study Rate Structure

The Association of Railway Executives at its spring meeting at Chicago on May 8, adopted a resolution directing heads of traffic departments of the railroads to make a thorough examination of the freight rate structure with a view to determining what revisions could be made to regain the revenue lost by the carriers during recent years. Among other things discussed at the meeting was the considerable expense created by valuation accounting.

At a luncheon, Rufus Dawes, president of the Chicago World's Fair Centennial Celebration of 1933, and Major Lennox R. Lohr, manager of the Fair, described the progress that has already been made in the final plans in contemplation for the fair. No formal action was asked at this time on the question



of participation by the railroads through the furnishing of exhibits and historical objects depicting the development of rail transportation.

### Missouri Bus and Truck Bill Signed by Governor

Governor Caulfield of Missouri has signed the truck and bus regulatory bill, passed by general assembly which reenacts virtually all of the regulatory provisions of the 1927 motor bus act and in addition places motor truck lines under the control of the State Public Service Commission. The new law places both common carriers and contract carrier truck lines under the jurisdiction of the commission but does not include privately owned trucks. Truck lines as well as bus lines must secure certificates of public convenience and necessity as prerequisites to operation and the commission in acting upon applications for certificates must give consideration to existing transportation service and to the effect which any proposed operation may have on such existing service. A bus tax of \$10 per seat is retained and trucks will be taxed in varying amounts ranging from \$25 for 1½ ton trucks to \$500 for trucks of more than nine tons capacity.

### Freight Rate Revisions Postponed

Further postponement of the effective date of the readjustments of class rates in western trunk line territory and official classification territory, as well as the inter-territorial rates, prescribed by the Interstate Commerce Commission last year, was announced by the commission on May 11 in a notice to all concerned that the rates prescribed must be made effective December 3, on not less than 45 days' notice. Successive postponements of the date originally fixed,

November 1, 1930, were made upon requests from the railroads because of the tremendous volume of work required to translate the commission's findings into tariff publications.

The notice states that all carriers realize the desirability of having the entire readjustment in the two proceedings become effective concurrently and the lake lines have urged that the rates be not established during the latter end of the navigation season; but all agree that December 3 is the most satisfactory and practical date.

### An Air-Conditioned Train

Anticipating the approach of hot weather, a train entirely air-cooled and air-purified will be placed in service on the Baltimore & Ohio about May 20, for the first time on any railway. The train to be air-conditioned is the "Columbian," running between New York, Philadelphia, Baltimore and Washington. All of its equipment, consisting of a smoking lounge car, observation sun-room car, latest type parlor cars, individual seat coaches, and colonial dining car, will be equipped with the air-purifying system, both north and south bound.

The apparatus not only regulates the temperature of the air but also controls the humidity and purifies the air, cleansing it of all particles of dust, cinders and smoke. The air is circulated without creating drafts.

The regulation of the temperature is automatically controlled by a thermostat and the apparatus functions both while the train is running and when it is standing still.

Years of experimental work by the mechanical engineers of the Baltimore & Ohio and the Mt. Clare shop forces at Baltimore were required to bring the air-conditioning system into practical use. It

was first introduced on the Baltimore & Ohio in a limited way last summer when the railroad successfully air-conditioned one of its diners.

### Lower Summer Rates on the Southern

The Southern Railway now sells on Friday, Saturday and Sunday morning, to all points on its lines, round-trip excursion tickets, at one fare plus 20 per cent; tickets good for return until Tuesday. Also for round trips within 150 miles, two-day tickets, sold at all times, at a reduction of about one-third; and six-day tickets at a reduction of one-fourth.

For use in coaches only, round-trip tickets to all stations will be sold each Friday, Saturday and Sunday with a return limit of 10 days, at one fare plus 10 per cent. For distances up to 100 miles, Sunday tickets will be sold at one cent a mile.

Thirty-day summer tourist tickets to northern and eastern cities and resorts will be sold on Tuesday and Thursday of each week from June 2 to September 29, at a reduction of about 25 per cent. Tickets of this class are also provided for trips by water northward from Norfolk, Charleston, Savannah and Jacksonville.

### Fuel Association Will Meet in the Fall

The annual meeting of the International Railway Fuel Association, usually held in May, has been postponed this year until the third week in September, when a two-day business session will be held, without exhibition or entertainment features. The decision to hold this meeting, which is scheduled for September 15 and 16 at the Hotel Sherman, Chicago, was made at a meeting of the executive committee of the association at Cin-

### Railroads, the Motorbus and Condemnation Proceedings

The decline in railroad revenues is continuing. The first 75 major systems to report gross operating income for February showed a loss of 21.1 per cent in comparison with 1930 and of 28.1 per cent with 1929. Net operating income was down 53 and 66.5 per cent, respectively, despite the tremendous efforts made by the various managements to reduce overhead. \* \* \*

The railroads have been blamed, and rightly, for failure to meet the initial competition of the motorbus by lowering their coach fares. They ran too heavily to extra-fare trains and too little to low-priced and frequent local schedules. Now that the trade recession and the airplane have between them thinned out the deluxe passenger lists, the roads are making a very determined and partly successful fight to retrieve some of their other passenger traffic.

Lower mileage charges and cut-rate

excursions are restoring the popularity of the longer trip by rail. In the short-haul field, however, the motorbus possesses certain operating advantages which cannot be overlooked. The stops of a heavy passenger train are limited of necessity to the number of stations along the right-of-way, but a bus can halt in the middle of a block and at any highway intersection.

Here a careful co-ordination of motorbus and train service is best to meet the needs of the traveling public, but the roads in attempting this co-ordination have met unexpected obstacles. An attempt by a railroad to operate a connecting service is a signal for a series of protests by bus-line owners before the commerce or public service commission of the state in question. Too often politics plays a part in a decision and too often the refusal that is forthcoming leaves the petitioning road with but two alternatives. One is to buy control of an existing motor service at an exorbitant price and the

other is to stay out of the field altogether.

If the standard of service to the traveling public is held the paramount factor, this situation calls for a remedy. The roads, by virtue of their heavy property investments and prior service in the field of transportation, should be allowed to extend feeder systems as they see fit. If this is held too great an injustice to existing bus services, a fair alternative would be the granting of the right of purchase by condemnation.

The railroads already have this prerogative in acquiring land for a new right of way. Its extension to the acquisition of motorbus lines would result in a fair price for both parties to the transaction and a material improvement in the quality of the transportation now available in many sections of the country.—From the Chicago Evening Post.

cinnati, Ohio, on May 11. It was the conclusion of the committee that economies in the purchase, handling and use of railway fuel are of more than ordinary importance at the present time; that the International Railway Fuel Association has, in the past, contributed substantially to fuel conservation progress on the railroads, and that to forego the annual meeting of the association this year would be to lose much ground already gained and to overlook an opportunity for still further reductions in operating expense. In deference to present reduced business activity and the urgent necessity for economy, it was decided to cut the annual convention from four days to two days and limit the addresses and committee reports strictly to those having a direct bearing on fuel performance.

### Urges Shipments via Railroads

In line with similar action taken elsewhere by corresponding groups, the Chamber of Commerce of Vanceburg, Ky., has adopted resolutions urging business men of that city and of the county in which it is located to ship by rail. These resolutions, as reported by the Lewis County Herald, and reprinted in the Chesapeake & Ohio Magazine, are as follows:

*Whereas*, The Chesapeake & Ohio Railway Company pays to the County of Lewis, City of Vanceburg, and the graded school district of the county, annually, a large sum of money in taxes, and

*Whereas*, the aforesaid company, by reason of said facts, is a large contributing factor to the prosperity and welfare of this city and county, and

*Whereas*, a large number of its employees live in this city and county and spend their earnings therein, and contribute to our local prosperity through the expenditure of their earnings and the payment of taxes on their property, and

*Whereas*, their happiness and prosperity is dependent upon the welfare and prosperity of the Chesapeake & Ohio Railway Company,

*Therefore, Be It Resolved*, by the Board of Directors of the Chamber of Commerce of the City of Vanceburg, Kentucky, that we urge the business houses and concerns of this city and county to request that freight shipped to them by the sender thereof be transported by the railway company, and thereby help to support a local asset and benefit our own citizens.

Board of Directors, Vanceburg Chamber of Commerce.

J. F. Bertram, President.

A. J. Stein, Vice-President.

B. H. Fisher.

Robert F. Jordon.

### Bonnet Carre Spillway Hearing

Engineers for the Illinois Central testifying before the commission appointed to appraise damages resulting from abandonment of property in the Bonnet Carre spillway area, between Lake Pontchartrain and the Mississippi river, at New Orleans, La., on May 5, estimated that an expenditure of \$2,019,822 would be required to construct a bridge for the use of the Yazoo & Mississippi Valley between Baton Rouge, La., and New Orleans. It is estimated that the bridge for the Illinois Central main line in the same area will cost about \$5,500,000.

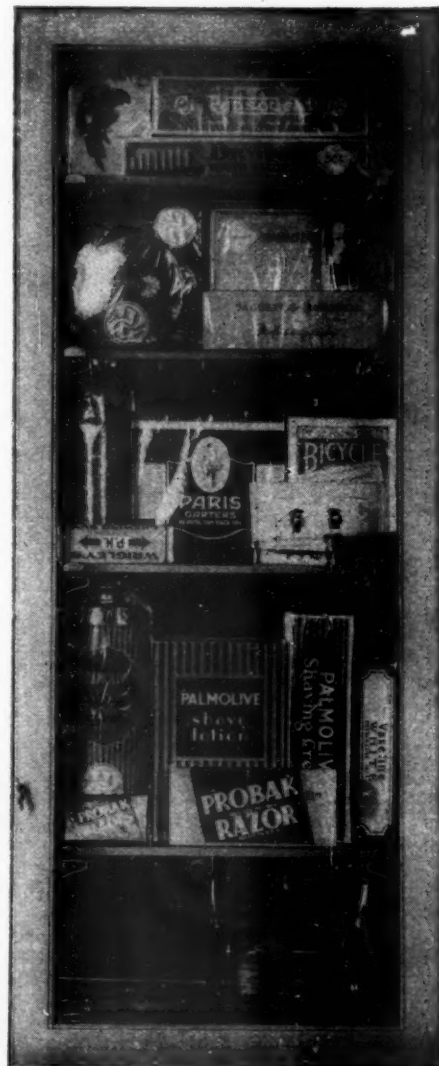
The Y. & M. V. estimate of cost is based upon the construction of a 9,073-ft. bridge across the spillway, with a 3,900-ft. approach on the north levee and a 4,600-ft. approach on the south levee. A. F. Blaess, chief engineer of the Illinois Central, testified that the railroad

plans to construct a creosoted pile bridge with ballasted deck and having concrete piers to serve as fire walls at intervals of 984 ft. Walkways with handrail will be provided on each side of the bridge. J. Carter Fort, assistant to the general counsel of the Illinois Central, stated that the railroad considered it should be awarded \$2,125,000 as damages for abandonment of the present Y. & M. V. line in the spillway area.

An argument between counsel for the government and the Illinois Central brought out the fact that negotiations for the construction of one bridge across the spillway for the joint use of the Y. & M. V., the Illinois Central and the Louisiana & Arkansas have been virtually abandoned.

### Pullman Company Vends Merchandise

The Pullman Company is equipping 50 sleeping cars with show cases to display various articles which passengers may purchase while on the train. The show case is set in the passage way adjacent to the tool case. The porter of each car is in charge of sales. If the merchandising plan proves successful on these 50 cars, it will be extended to include all Pullman sleeping cars.



Pullman Car Show Case

## Foreign

### British Railroad Revenues Show Continued Drop

In the aggregate, revenues of British railroads during the first thirteen weeks of 1931 (to March 29), decreased by \$21,203,341, as compared with the corresponding period of 1930, according to a report from Consul-General Halstead, London. This heavy fall arose mainly through a decline of \$12,290,345 in merchandise freight revenue, while passenger revenue decreased by \$4,871,367, and coal and coke traffic by \$4,041,629.

The London, Midland & Scottish reported the largest total decline; namely, \$7,854,531, of which \$5,533,210 applied to merchandise freight; \$1,640,011 to passenger traffic, and \$681,310 to coal and coke. The London & North Eastern returned an aggregate which was \$7,236,486 lower than a year ago, and of this \$4,170,590 related to merchandise freight; \$1,591,346 to passenger services, and \$1,474,550 to coal and coke traffic. On the Great Western the total decrease amounted to \$4,988,162, of which \$2,073,129 was in merchandise freight; \$1,966,066 in coal and coke transport, and \$948,967 in passenger revenue. The Southern's receipts declined by \$1,124,162 including \$691,043 in passenger services, and \$513,416 in merchandise freight, while coal and coke revenue rose by \$80,297.

### French Company Gets Concession for Polish Railway Line

An important railway line, running north from Poland's richest coal fields, in Upper Silesia, to her new port of Gdynia, in the Polish corridor on the Baltic Sea, is to be completed and in operation within three years, under the terms of a concession recently granted to a French company, according to newspaper reports from Warsaw and Berlin. The new company, to be known as the Societe Franco-Polonoise de Chemins de Fer, will have headquarters in Paris, while eight-fifteenths of the capital will be held in France. Funds for the construction of the new line, which is to run entirely in Polish territory, avoiding altogether the free port of Danzig, are to be raised by the sale of 6½ per cent bonds to the amount of approximately 1,000,000,000 francs (about \$40,000,000), interest on which will be guaranteed by the Polish government, and which will be redeemable in 45 years, this being the period of the concession. During this time the French company will continue to operate the railroad, using, under a first mortgage, rolling stock, tracks and other equipment, owned by the Polish government. The government is also understood to have guaranteed the company a minimum operating profit.

Since the Polish State Railways were largely inherited after the war from Germany, Austria and Russia, which had concentrated on the construction of strategic military lines running mainly in an east-west direction, the new Gdynia-



Upper Silesia railway will be the first important north-south route in Poland. Upper Silesian coal mines, which are also government-owned, although operated by private companies in which French capital is vitally interested, have an annual surplus production, available for export, of some 2,000,000 tons of coal, which, however, is profitable only if shipped by sea. A railroad affording these mines a direct outlet to tidewater at Gdynia, the only important port on Polish territory, is, therefore, necessary to the prosperity of Poland in general and of Upper Silesia and the city of Gdynia in particular. Such a line was actually begun some years ago, being financed out of whatever revenue was available from other state railways, but progress was necessarily slow, and stopped altogether at the beginning of the present economic depression. Only through the use of foreign capital could the new line be completed within any reasonable time, and the French concession resulted from this necessity.

Polish opinion as to the wisdom of the plan is divided, the government contending that it will be the forerunner of additional foreign investment which will aid in the economic development of the country, and opposition parties holding that it is costly, risky and humiliating for a state of Poland's importance to depend too largely on outside capital. In Germany, on the other hand, the new line is seen as an important move on the part of the Poles to strengthen their hold on the Polish corridor; to block revision of the German-Polish frontier and to threaten the prosperity of the former German city of Danzig.

### Transport Developments in East Africa

Since the submission to the British Colonial office, late in 1929, of the report of the Zambezi Bridge Commission, several important steps have been taken in carrying out the recommendations contained therein. These had as their basis the intelligent development of a co-ordinated system of rail, lake and highway transportation to serve the British colony of Nyasaland, and to connect it with Beira, Portuguese East Africa, the nearest developed seaport.

As outlined in a summary of the Commission's report published in the *Railway Age* of February 8, 1930, page 407, Blantyre, the present railhead in southern Nyasaland, is connected with Beira by three railroads—the Shire Highlands, the Central Africa and the Trans-Zambezi—forming a 351-mile line from the interior to the coast. This line, however, is broken by the Zambezi river between the northern terminus of the Trans-Zambezi at Murraca and the southern end of the Central Africa at Chindio. Across this two-mile gap, freight must be trans-shipped on barges, being loaded and unloaded from cars on both banks.

Since the removal of this obstacle is the primary requirement in any efficient system of transportation designed to develop the Nyasaland Protectorate and to permit the exploitation of its natural re-

sources, the first recommendation of the Commission dealt with the construction of a bridge over the Zambezi river. In addition to this, it advocated physical betterment and new rolling stock for the three existing railways; the extension of the Shire Highlands north from Blantyre to Fort Johnston, on Lake Nyasa, about 130 miles; the purchase of a steamer for improvement of freight services on that lake, and the construction of heavy-duty highways to the railroad or the lake from points in central and northern Nyasaland to which railways cannot now be economically built because of physical or financial difficulties, or lack of sufficient developed traffic.

The most important of the Commission's recommendations—the Lower Zambezi bridge—assumed tangible form last fall, when a contract for its construction was signed between the Central Africa and Trans-Zambezi Railways and the Cleveland Bridge & Engineering Co., Ltd., of Darlington, England. The site selected is that proposed by the Commission, between Sena and Mutarara, some 25 miles above the present Murraca-Chindio crossing. Chosen for its advantages from an engineering viewpoint, this location requires the construction of new railroad on the south bank of the Zambezi between Sena and the Trans-Zambezi Railway near Murraca, and on the north bank to connect the Mutarara bridge head with the Central Africa line at Bawe, two or three miles. The bridge itself, with a total length of 11,650 ft., will rank as the longest railway bridge in the world, and will consist of 30 spans of 266 ft. each, with a height of 54 ft. above normal water level and 27 ft. above the highest recorded flood level. Only a comparatively small portion of its length will be over the normal channel of the Zambezi, but approach spans will carry a single railway track and a sidewalk inland for about 500 ft. on the north of the river and for two miles on the south (Sena) bank, where the land is low and subject to floods. The contract price, including the bridge and connecting railways, is £1,434,337 (\$6,970,878); while construction will require about four years, and has been undertaken under a concession from the Portuguese government to the British Central Africa Company, by the terms of which the bridge, located in Portuguese East Africa, will revert to the government of Portugal without consideration 99 years after the date of the concession, July 10, 1912.

At about the same time that the bridge contract was signed, a new operating company, to be known as Nyasaland Railways, Ltd., was formed in England. Its objects, according to the Railway Gazette (London), are "to acquire not less than 90 per cent of the issued share capital of the Central Africa Railway Co., Ltd., to acquire the undertaking and assets of the Shire Highlands Railway (Nyasaland), Ltd.; to acquire, construct, take concessions of, work and manage in Nyasaland and elsewhere any rail-

ways, tramways, motor services, etc." The directors of the new company include representatives of the two companies to be absorbed by it; of the Trans-Zambezi; of the Rhodesia Railways, with which it is eventually planned to connect the Nyasaland system, and of the Nyasaland government. The chairman of the board is William Codrington, former chairman of the Shire Highlands. Although only 39 years of age, he has had considerable experience in Colonial affairs and in railway administration, serving prior to 1925 in the British foreign service at London and Tangier, and subsequently as secretary of the Great Western Railway of Brazil and of the Argentine Transandine Railway. He is also a director of the Great Western and Madeira-Mamore Railways of Brazil, of the Piraeus, Athens & Peloponnesus Railway of Greece, and of several British industrial firms.

Following out additional recommendations of the Zambezi Bridge Commission, the government of Nyasaland is undertaking the improvement of steamship services on Lake Nyasa, to take advantage of that natural navigable waterway; and is planning the rebuilding of highways tributary to lake ports or to existing or projected railways, with the object of making those roads suitable for use by motor trucks engaged in local traffic or feeder services. The cost of these improvements, including that of extending the Shire Highlands Railway from Blantyre to the southern end of Lake Nyasa—work on which has now been started—is estimated at about £1,816,000. Funds will be provided from a loan to be raised by the government of Nyasaland under the Palestine & East Africa Loans Act of 1926, interest on which will be guaranteed by the British Imperial Government. A free grant of interest during the initial years, up to a maximum of £500,000, is also being made by the Imperial Government out of the Colonial Development Fund.

Of additional advantage to the colony of Nyasaland and the Lower Zambezi valley, although not included in the plans of the Bridge Commission, is the development of the port of Beira, through which all imports and exports for this territory pass. Begun in 1926 and still in progress under the direction of Beira Works, Ltd., these developments include the partial abolition of ship-to-shore lighterage by the provision of deep-water wharves; the dredging of the harbor; erection of cranes and transfer sheds; the reclamation of land, and the construction of additional railway facilities. Improvements already completed have produced increased efficiency in handling a transit traffic that grew from 820,624 tons in 1927 to 1,062,007 tons in 1929; while additional projects contemplated or under way appear fully sufficient to care for all traffic developed in the immediate future by provision of efficient transportation service in Nyasaland and other territories tributary to the port of Beira.

## Supply Trade

The Associated Machine Tool Dealers will hold its semi-annual convention at Granville Inn, Granville, Ohio, on June 4 and 5.

George A. Orrok, David Moffat Myers and W. A. Shoudy, consulting engineers, have opened a joint office at 21 East Fortieth street, New York City.

Alvah H. Warren, Jr., assistant manager of sales of the Illinois Steel Company, Chicago, with headquarters at St. Paul, Minn., has been promoted to manager of sales to succeed W. J. Totten, retired.

James B. Sipe & Company, Inc., Pittsburgh, Pa., has moved its New York City office from 165 Broadway to a new salesroom and office at 221 Fourth avenue. James J. Reegan is manager of railway sales.

The Dardelet Threadlock Corporation, New York, has granted licenses to the Colorado Fuel & Iron Company, for the manufacture and sale of track and commercial bolts and nuts formed with the Dardelet self-locking thread.

A. F. O'Connor, who has been with the Union Railway Equipment Company, Chicago, for the past 16 years, has resigned as vice-president and director of that company to become assistant to vice-president of the Equipment Specialties Company, Chicago.

W. R. Meadows, Inc., Elgin, Ill., has placed E. H. Batchelder, Jr., 608 South Dearborn street, Chicago, in charge of the railroad sales of asphalt plank and expansion joints. Mr. Batchelder is also president of the Federal Equipment Corporation, of that address.

The Blaw-Knox Company, Pittsburgh, Pa., has acquired the exclusive sales and manufacturing rights of the ATECO line of earth moving machinery from the American Tractor & Equipment Company, Oakland, Cal., for the United States east of the Rocky Mountains and for all other countries.

H. T. Bennett, assistant manager of sales of the American Sheet & Tin Plate Company, Pittsburgh, Pa., with headquarters at Chicago, has been promoted to manager of sales, with the same headquarters, to succeed W. H. Eaton, retired, and has been succeeded by A. P. Bronson, representative at Chicago.

J. E. Buckingham, formerly at Harrison, N. J., has been appointed western regional manager of the railroad division, Worthington Pump & Machinery Corporation, with headquarters at Chicago, to succeed J. M. Lammedec, resigned. D. S. Ellis, with headquarters at Harrison, will continue as eastern regional manager of the railroad division.

Fansteel Products Company, Inc., North Chicago, Ill., has organized a subsidiary, the Ramet Corporation of America, to take over the United States and Canadian rights for hard cutting metals developed by the former company. The officers of the new company are: President, J. M. Troxel, chairman of the board of Fansteel; vice-president and general manager, C. E. Stryker, manager of Balkite sales of Fansteel; and secretary and treasurer, E. F. Radke, secretary and treasurer of Fansteel.

At a recent meeting of the board of directors of the General Refractories Company, Philadelphia, Pa., Burrows Sloan was elected chairman of the board, John R. Sproul was elected president, E. A. McKelvy was elected vice-president and Roger A. Hitchins was elected secretary and treasurer. All of the other officers of the company were reappointed. In addition to being president and a director of the General Refractories Company, John R. Sproul is a director of the Lehigh Valley, the Philadelphia, Baltimore & Washington and vice-president and director of the Lackawanna & Wyoming Valley.

R. H. Bacon, advertising manager of Fairbanks, Morse & Company, with headquarters at Chicago, has been promoted to manager of the pump sales division, with the same headquarters. Mr. Bacon graduated from the University of Illinois in 1916, after which he was employed as assistant engineering



R. H. Bacon

editor of Electrical World and assistant electrical engineer for the Copper Range Mining Company. From 1922 to 1925 he was associate editor of Power Plant Engineering, resigning in the latter year to take charge of publicity for the Diesel engine division of Fairbanks, Morse & Co. Shortly thereafter he was placed in charge of general publicity, and since 1929 has been manager of the advertising and publicity department.

J. K. Aimer has been appointed assistant general manager of sales of the Reading Iron Company, with office at 230 Park avenue, New York. W. S.

Shiffer has been appointed assistant to general manager of sales, and R. I. Fretz has been transferred from the Reading district and is in charge as district sales representative of the Pittsburgh district in place of Wyman Howells, who now directs the activities of the Reading district; Harry L. Bialock is associated with the St. Louis district under the direction of J. L. Jacobson, district sales representative; L. C. Hartzell, under the direction of R. W. Thompson, Reading, Pa., is engaged in the promotion of the nipple business; George D. Smith, has been appointed railroad salesman under the direction of Mr. Aimer and E. S. Moorehead has been assigned to the Pittsburgh district under the direction of Mr. Fretz.

## Equipment and Supplies

### FREIGHT CARS

THE NORTHERN PACIFIC is inquiring for 500 underframes for box cars and a quantity of miscellaneous parts for superstructures.

THE STANDARD OIL COMPANY OF NEW JERSEY has ordered four tank cars of 4,500 gal. capacity from the Magor Car Corporation. Inquiry for this equipment was reported in the *Railway Age* of March 28.

### IRON & STEEL

THE WABASH is inquiring for 800 tons of structural steel for a bridge at Oakwood, Mich.

THE CHICAGO, BURLINGTON & QUINCY is inquiring for 700 tons of structural steel for a bridge at La Salle, Ill.

THE CHICAGO & NORTH WESTERN is inquiring for 1,700 tons of structural steel for track elevation work at Kenosha, Wis.

THE LOUISVILLE & NASHVILLE has ordered 540 tons of structural steel for bridge work from the Virginia Bridge & Iron Company.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for 4,100 tons of structural steel for a bridge across the Illinois-Michigan canal.

THE MISSOURI PACIFIC has ordered 500 tons of structural steel for viaduct work at Webster Grove, Mo., from the McClintic-Marshall Company.

THE GREAT NORTHERN was incorrectly reported in the *Railway Age* of April 25 as having ordered 16,000 tons of rails from the Bethlehem Steel Company. The only order placed at that time was for 9,000 tons from the Colorado Fuel & Iron Company.



## Construction

**CHESAPEAKE & OHIO.**—Contracts for three projects involving estimated expenditures totaling \$1,669,700 have been awarded by this road to Boxley Brothers Company, Inc., of Orange, Va. The largest of the three, to cost about \$1,148,000, involves the construction of a new double track in Second Creek tunnel and a bridge over Greenbrier river in connection with a revised alignment at Rockland, W. Va.; the second, involving a cost of about \$416,500, at Ft. Springs, W. Va., contemplates the construction of a new single track tunnel parallel to Mann's tunnel at that point; the third is for a double track bridge over Main street at Gordonsville, Va., to cost about \$105,200.

**CHICAGO & NORTH WESTERN.**—The Wisconsin State Highway Commission has awarded contracts for the construction of eleven grade separation structures over the tracks of this company in Wisconsin, involving a total expenditure of \$277,326, which will be borne jointly by the state and the railroad. The projects, with the names of the contractors and the cost of each, are as follows: Rosemere, to J. C. Basten, Green Bay, Wis., \$40,985; Fonda, to Bentley Brothers, Inc., Milwaukee, Wis., \$75,435; Witenberg, to Jorgenson Construction Company, Denmark, Wis., \$31,709; Bain, to F. H. Krueger, Milwaukee, \$13,783; North Tomah, to Hoepfner-Bartlett Company, Eau Claire, Wis., \$14,117; Husher, Racine county, to F. H. Krueger, \$12,143; Lavalley, to R. G. Hase, Spring Green, Wis., \$18,618; Hammer, Dodge county, to N. C. Brogan, White Fish Bay, Wis., \$12,861; West Forest Junction, Calumet county, to Peppard & Fulton, Superior, Wis., \$26,551; Thornton, Shawano county, to T. J. Vitcenda, Madison, Wis., \$16,186, and Lake George, Oneida county, to Peppard & Fulton, \$13,938.

**CHICAGO, BURLINGTON & QUINCY.**—Company forces have begun the construction of a reinforced concrete and steel viaduct over Riverview drive at Prospect Hill, St. Louis, Mo., at a cost of about \$101,000. It is also planned to construct a bridge over the Maline Creek drainage project in the same vicinity at a cost of about \$89,000. In each case, half of the cost will be borne by the City of St. Louis.

**CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.**—The Missouri Public Service Commission has approved plans for the construction of a viaduct to carry Highway No. 4 over the tracks of this company near Lucerne, Mo., at a cost of \$31,000.

**ILLINOIS CENTRAL.**—A contract for the construction of a reinforced concrete and brick freight station at East St. Louis, Ill., has been awarded to the Ellington Miller Company, Chicago.

**INDIANA HARBOR BELT.**—A contract has been let to the Walsh Construction Company, Davenport, Iowa, for the elevation of about 1.5 miles of this company's line

at Bellwood, Ill. This project includes three street subways and the separation of grades with two other railroads.

**LONG ISLAND.**—The Merrick road crossing of this company's tracks, Valley Stream, N. Y., has been designated for elimination by the New York Public Service Commission. The separation will be carried out by raising the grade of the railroad on its present alignment and carrying it over the highway on a viaduct starting about 1,800 ft. west of the crossing, and estimated to cost about \$482,400. This plan will also permit the elimination of grade crossings at Scranton, Roosevelt, Rockaway, Franklin, Satterie, Horton and Wright avenues.

**LOUISVILLE & NASHVILLE.**—A contract has been awarded to A. J. Honeycutt, Birmingham, Ala., for the construction of three reinforced concrete pedestrian and baggage subways at the passenger station at Birmingham, at a cost of about \$110,000.

**MISSOURI PACIFIC.**—A contract has been awarded to the McClintic-Marshall Company, Pittsburgh, Pa., for 500 tons of structural steel for the construction of a double-track viaduct to carry the tracks of this railroad over Lockwood avenue at Webster Groves, Mo. Bids were closed on May 8 for the general construction of the viaduct. The total cost of the structure, about \$70,000, will be shared by the railroad, St. Louis county and the St. Louis Public Service Company.

**NEW ORLEANS PUBLIC BELT.**—Bids will be closed on June 4 for the construction of a combined railroad and highway bridge over the Mississippi river above New Orleans, La., at a total estimated cost of \$15,000,000. Bids have been requested separately for the substructure of the main bridge, the superstructure of the main bridge, the substructure of the approaches and the superstructure of the approaches.

**NEW YORK CENTRAL.**—The Public Service Commission of New York, has designated for elimination grade crossings of this company's tracks at Ontario street and Sheridan drive, Tonawanda, N. Y., and has approved the construction of a bridge to carry Harlem avenue, Cheektowaga, N. Y., over the West Shore Railroad.

**PENNSYLVANIA.**—This company has requested contractors to submit bids on May 20 for the masonry work for the construction of 23 new street subways for the elevation of the Englewood Connecting Railway between Hamilton and Stewart avenues, Chicago. This portion of the work also involves the extension of a number of existing street subways.

**ST. LOUIS-SAN FRANCISCO.**—The Missouri Public Service Commission has approved plans for the construction of a viaduct to carry Highway No. 71 over the tracks of this company near Crocker, Mo., at a cost of about \$20,000.

**TEXAS & PACIFIC.**—A contract has been let to P. O'B. Montgomery, Dallas, Texas,

for the construction of a two-story brick and steel express and baggage building at Fort Worth, Texas, at a cost of \$170,000. The structure will have outside dimensions of 80 ft. by 220 ft. Later a concourse will be constructed to connect the building with the passenger station. A contract for the construction of five service buildings at the passenger coach yard at Fort Worth has been awarded to F. A. Mote, Dallas.

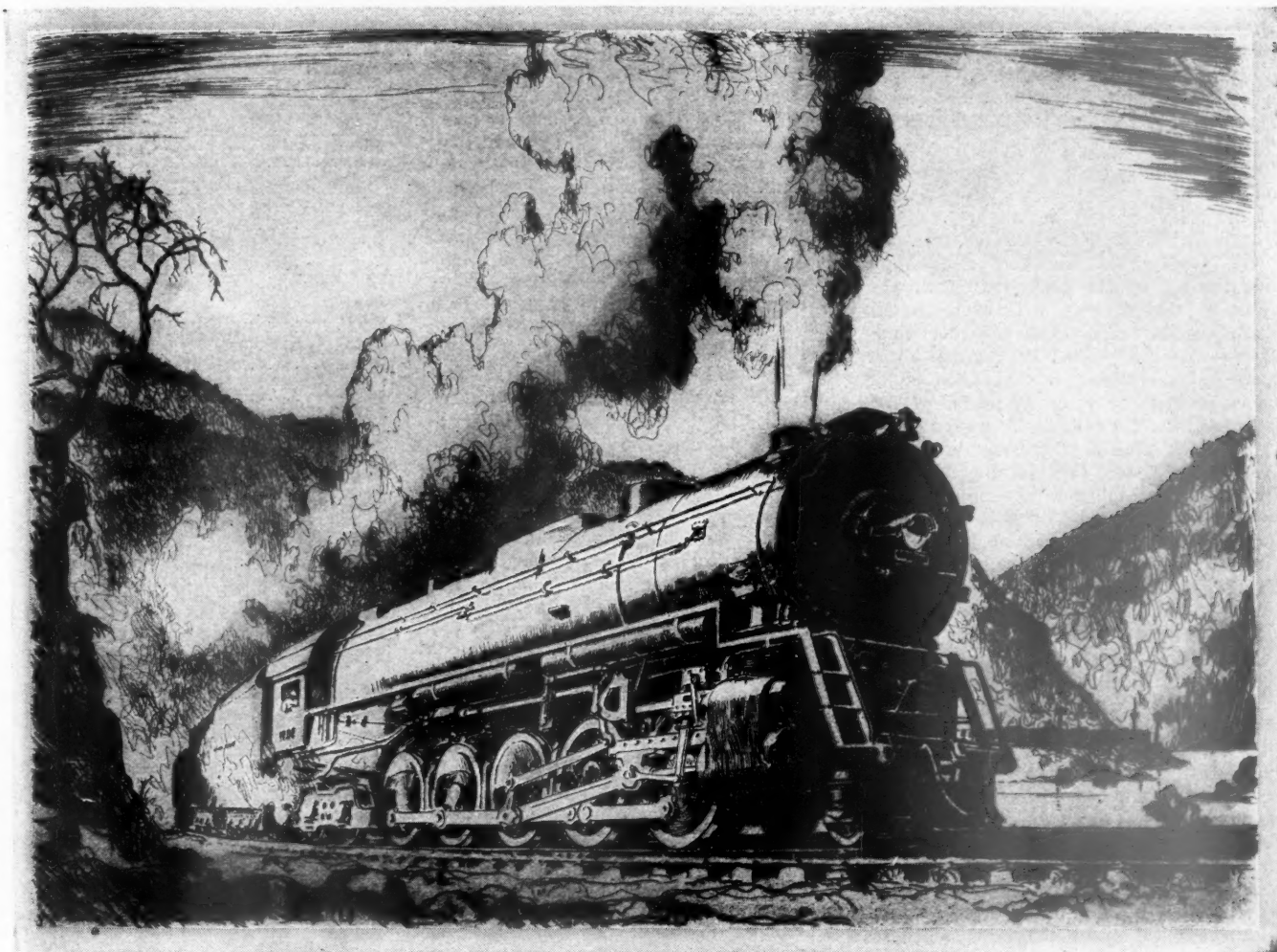
## Financial

**BALTIMORE & OHIO.—Acquisition.**—This company has applied to the Interstate Commerce Commission for authority to acquire control of the Mt. Jewett, Kinzua & Riterville, which has a line of about 24 miles in Pennsylvania, by purchase of its capital stock for \$58,709, in accordance with an agreement made in connection with its acquisition of the Buffalo, Rochester & Pittsburgh, with which the short line connects. The B. & O. proposes to operate only 4 mile of the line, from Mt. Jewett, Pa., to Kushequa, and the Mt. Jewett, Kinzua & Riterville and six separate companies which own segments of the property leased to it have applied for authority to abandon 19.48 miles from Kushequa to East Smethport.

**BALTIMORE & OHIO.**—The Interstate Commerce Commission on May 12 declined to engage in a "fishing expedition" into the past history of the Chicago & Alton prior to the court sale of its property to agents for the Baltimore & Ohio last December. It denied an appeal taken by the protective committee representing common stockholders of the old Alton company from rulings of Director O. E. Sweet of the commission's Bureau of Finance and of Commissioner Meyer excluding testimony as to relations between Kuhn, Loeb & Co., and the Alton and B. & O. companies and security holders of the Alton and denying the application for subpoenas to compel the testimony of representatives of Kuhn, Loeb & Co. The full commission listened to oral argument on the question for an hour and a half and then announced that it would not allow the broadening of the issues raised by the Baltimore & Ohio's application for authority to acquire control of the Alton property by purchasing the stock of the Alton Railroad, a new company formed to take over the property acquired at the court sale. This terminated the hearing on the application, but briefs are to be filed and oral argument yet to be heard on the merits of the application.

Representatives of the stockholders have contended that Kuhn, Loeb & Co., while acting as reorganization managers and in a fiduciary relation to the stockholders, deserted the latter and turned control of the property over to the B. & O. by obtaining for it a majority of the bonds in default, which enabled the B. & O. agents to purchase the property at a price which represented no equity for the stockholders. They have also sought

*Continued on Next Left Hand Page*



## AN OPERATING PROBLEM... and its Solution

- The Chesapeake and Ohio Railway desired a single motive power unit capable of handling unbroken trains between Russell, Ky. and Toledo, Ohio (326 miles) without reducing tonnage.
- The existing Mallets were inadequate.
- The Lima 2-10-4 Super-Power Locomotives solved this problem by providing a unit with the same starting power as the Mallet, but having 8% more sustained power at 30 M.P.H., coupled with the ability to make the continuous run.



**LIMA LOCOMOTIVE WORKS • Incorporated • LIMA • OHIO**



throughout the hearing to connect the B. & O. with knowledge of the bankers' relations with the stockholders. On the other hand officials of the B. & O. denied official knowledge of transactions preceding their purchase of the bonds and on argument H. W. Anderson, of counsel for the B. & O. contended that the commission had no jurisdiction to go back of the court sale of the property. If the stockholders had been wronged, he said, their remedy is in the courts, although the federal courts concerned with the Alton sale have twice declined to permit them to intervene after hearing their arguments. He pointed out that the court had held that there was \$122,000,000 of debts against the property ahead of the stock, which the B. & O. proposes to satisfy by paying or assuming about \$76,000,000, and said that if the B. & O. should pay anything to the stockholders it would be required to satisfy the entire indebtedness. He differentiated this case from that of the Chicago, Milwaukee, St. Paul & Pacific, in which the commission reviewed the details of the reorganization plan, by showing that that was a voluntary plan participated in by representatives of various classes of securities which the commission was asked to authorize.

Prior to the argument witnesses for the stockholders' committee had been permitted by Director Sweet to introduce testimony as to the value of the Alton property, not, he said, on the theory that the commission was to review the price approved by the court, but on the theory that it might be of interest in connection with the question of the reasonableness of the terms on which the B. & O. proposes to acquire the property. W. A. Van Hook, of Ford, Bacon & Davis, testified that the cost of reproduction less depreciation of the property as of 1930 was \$115,875,056, based on prices for the preceding five years applied to the commission's tentative valuation of about \$76,000,000 as of 1919. J. A. Emery, of the same firm, also testified that the property was worth \$125,000,000, taking all factors into consideration, and that it would be worth more to the New York Central or the Van Sweringen lines. N. D. Ballentine, consulting engineer, gave an analysis of the Alton's operations and physical characteristics, saying that it is in splendid condition and has a potential capacity which should make it a valuable property if combined with a large system. He said that \$15,000,000 had been expended on it during the receivership. He gave figures to indicate that the property would be worth more in the hands of the New York Central or Van Sweringen lines than if combined with the B. & O. Mr. Sweet announced that the commission had denied a request of counsel for the stockholders' committee that it issue a subpoena for W. G. Bierd, receiver and former president of the Alton, but by arrangement with counsel Mr. Bierd testified briefly on May 11 that the commission's tentative valuation of \$76,000,000 as of 1919 was far too low.

**CANADIAN PACIFIC.—Dividend Reduced.**—The directors meeting in Montreal have

reduced the quarterly dividend rate of this company as of June 1 to 1¼ per cent instead of 2½ per cent as heretofore.

**CANADIAN PACIFIC.—Annual Meeting.**—When conditions in Canada improve the Canadian Pacific is in immediate position to get the benefit of such improvement, was a note of cheer which E. W. Beatty, K.C., president of the Canadian Pacific, gave the shareholders at the fiftieth annual meeting of the company held in Montreal last week. With revenues heavily fallen in 1929 and 1930, and the results of the first three months of the present year also reflecting present day Canadian conditions, despite the fact that all possible economies had been effected though care had been taken to prevent impairment of the property, the directors of the company were placed in a condition where they had to decide as to the dividend, said the president. This statement was supplemented later in the day, when following a meeting of the directors, after the annual meeting, announcement was made that the dividend was reduced from 10 per cent to 6 per cent.

Mr. Beatty called attention to the fact that salaries of office staffs had been reduced approximately 10 per cent, and that the salaries of the president, vice-presidents, and senior officers would also be cut 10 per cent. The directors accepted the same situation, a by-law being brought forward to amend the by-law setting the directors' fees. The cut here is also 10 per cent, and will continue as long as the reduction in the salaries of the employees continues. The shareholders authorized an additional issue of \$50,000,000 of common stock, which, when issued will mean a total of \$385,000,000, Mr. Beatty explaining that it was not intended to issue the stock unless conditions were favorable and should such be the case before the next annual meeting, it was advisable to have the needed authority now rather than call a special general meeting of the shareholders.

**CENTRAL OF NEW JERSEY.—Acquisition.**—This company has applied to the Interstate Commerce Commission for authority to acquire control of the Raritan River by purchase of capital stock, stating that it has acquired 5,372 shares out of a total of 10,000, at an average of \$171.90 a share, including 424 shares under option at \$200 a share.

**ILLINOIS CENTRAL.—Notes.**—This company has applied to the Interstate Commerce Commission for authority to issue \$20,000,000 of three-year 4½ per cent notes, to be sold to Kuhn, Loeb & Co. at 98½ and interest, the proceeds to be used to retire equipment trust notes, bank loans and other obligations.

**LEHIGH & NEW ENGLAND.—Annual Report.**—The 1930 annual report of this company shows net income after interest and other charges of \$715,801 as compared with net income of \$802,350 in 1929. Selected items from the Income Statement are shown in the following table:

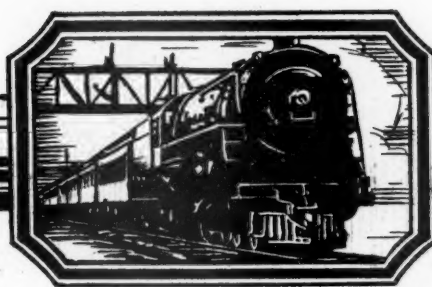
	1930	1929	Increase or Decrease
Average mileage operated .....	216.67	216.67	.....
RAILWAY OPERATING REVENUES.....	\$5,065,787	\$5,084,658	— 18,871
Maintenance of way .....	628,181	614,758	+ 13,423
Maintenance of equipment .....	1,006,579	1,120,623	—114,044
Transportation .....	1,754,386	1,765,097	— 10,710
TOTAL OPERATING EXPENSES .....	3,783,691	3,770,365	+ 13,325
Operating ratio .....	74.69	74.15	+ .54
NET REVENUE FROM OPERATIONS .....	1,282,096	1,314,293	— 32,197
Railway tax accruals .....	109,139	72,210	+ 36,929
Railway operating income .....	1,172,948	1,241,816	— 68,868
Hire of equipment—Cr. ....	61,643	70,923	— 9,279
Joint facility rents .....	140,925	134,878	+ 6,047
Non-operating income .....	107,298	116,400	— 9,102
GROSS INCOME .....	1,280,247	1,358,217	— 77,970
Interest on funded debt....	385,156	385,681	— 525
TOTAL DEDUCTIONS FROM GROSS INCOME .....	564,445	555,866	+ 8,578
NET INCOME .....	715,801	802,350	— 86,548

**NASHVILLE, CHATTANOOGA & ST. LOUIS.—Annual Report.**—The 1930 annual report of this railway shows net income after interest and other charges of \$922,136 as compared with net income of \$3,623,948 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
Average Mileage Operated .....	1,203.39	1,235.26	— 31.87
RAILWAY OPERATING REVENUES .....	\$19,317,453	\$23,203,724	— 3,886,271
Maintenance of way ....	2,925,963	2,717,425	+ 208,538
Maintenance of equipment .....	4,082,228	4,649,290	— 567,062
Transportation .....	7,404,441	8,031,216	— 626,775
TOTAL OPERATING EXPENSES .....	16,343,711	17,397,378	— 1,053,667
Operating ratio .....	84.61	74.98	+ 9.63
NET REVENUE FROM OPERATIONS .....	2,973,742	5,806,345	— 2,832,603
Railway tax accruals ..	767,537	1,081,000	— 313,463
Railway operating income .....	2,206,205	4,725,345	— 2,519,140
Equipment rents—Dr. ..	373,893	167,332	+ 206,561
Joint facility rents .....	284,969	288,845	— 3,876
NET RAILWAY OPERATING INCOME ..	2,112,287	4,845,801	— 2,733,514
Non-operating income ..	439,382	420,006	+ 19,376
GROSS INCOME .....	2,551,670	5,265,807	— 2,714,137
Rent for leased roads .....	806,506	806,506	.....
Interest on funded debt ..	740,016	750,606	— 10,590
TOTAL DEDUCTIONS FROM GROSS INCOME .....	1,629,533	1,641,858	— 12,325
NET INCOME .....	922,136	3,623,948	— 2,701,812

**SEABOARD AIR LINE.—Abandonment.**—The receivers have applied to the Interstate Commerce Commission for authority to abandon part of the Covington branch

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*Alco**Alco*

## To Economize — Modernize The Profits Now Lost Would Pay The Cost

"Comparing the relative improvements in operating costs effected during the two periods, 1920-1925, and 1925 to 1929, a marked slowing up in the rate at which some of these reductions in expenses are taking place is quite evident. This, in a general way, supports the belief that the major opportunities for improvements in operating and maintenance practices are gradually being exhausted. To the extent that this is true it then becomes evident that more dependence will have to be placed in the contributions of modern locomotives in the future in order that reductions in the direct costs of operation may continue to be made without interruption."

With 80 per cent of the locomotives over 10 years old, it would seem that the doorway leading to future reductions in costs of operation is wide open.

*Quoted from Railway Age  
January 3, 1931*

**American Locomotive Company**  
30 Church Street                      New York N. Y.

*Alco**Alco*



8.81 miles, and the St. Marks branch, 2.7 miles, in Florida.

**NEW YORK, CHICAGO & ST. LOUIS.—Annual Report.**—The 1930 annual report of this company shows net income after interest and other charges of \$4,396,743 as compared with net income of \$7,390,042 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
RAILWAY OPERATING REVENUES .....	\$46,533,185	\$56,385,456	—9,852,270
Maintenance of way.....	6,078,735	7,015,494	— 936,758
Maintenance of equipment	8,799,383	10,688,773	—1,889,390
Transportation .....	17,245,756	19,466,457	—2,220,700
TOTAL OPERATING EXPENSES .....	35,111,798	39,896,885	—4,785,087
NET REVENUE FROM OPERATIONS .....	11,421,387	16,488,571	—5,067,183
Railway tax accruals ..	2,567,618	3,055,399	— 487,781
Railway operating income	8,841,795	13,428,145	—4,586,350
Equipment rents—Net	2,714,065	2,707,462	+ 6,603
Joint facility rents—Net	478,975	248,684	+ 230,290
NET RAILWAY OPERATING INCOME .....	5,648,754	10,471,998	—4,823,244
Non-operating income .....	6,675,246	3,215,834	+3,459,411
GROSS INCOME .....	12,324,000	13,687,833	—1,363,832
Rent for leased roads	258,331	3,903	+ 254,427
Interest on funded debt.	7,529,038	5,919,507	+1,609,531
TOTAL DEDUCTIONS FROM GROSS INCOME .....	7,927,256	6,297,791	+1,629,465
NET INCOME .....	4,396,743	7,390,042	—2,993,298
Disposition of net income: Income applied to sinking funds..	98,138	98,557	— 419
Dividend appropriations of income..	.....	4,185,294	—4,185,294
Income balance transferred to profit and loss	4,298,605	3,106,190	+1,192,415

**PERE MARQUETTE.—Annual Report.**—The 1930 annual report of this company shows net income after interest and other charges of \$2,015,015 as compared with net income of \$7,473,279 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
Average mileage operated.	2,252.95	2,241.70	+ 11.25
RAILWAY OPERATING REVENUES .....	\$37,216,377	\$48,468,439	—11,252,061
Maintenance of way.....	5,369,882	5,614,108	— 244,225
Maintenance of equipment	7,602,893	10,534,757	— 2,931,863
Transportation .....	13,783,063	15,916,795	— 2,133,731
TOTAL OPERATING EXPENSES .....	29,030,270	34,345,301	— 5,315,030
Operating ratio .....	78.00	70.86	+ 7.14
NET REVENUE FROM OPERATIONS .....	8,186,107	14,123,138	— 5,937,030
Railway tax	.....	.....	.....

	1930	1929	Increase or Decrease
accruals .....	1,942,719	2,962,195	— 1,019,475
Railway operating income.	6,232,583	11,150,408	— 4,917,825
Equipment rents (Net)	97,032	1,124,368	— 153,335
Joint facility rents (Net)	720,386	752,623	— 32,237
NET RAILWAY OPERATING INCOME .....	4,541,163	9,273,416	— 4,732,252
GROSS INCOME .....	5,101,916	10,150,785	— 5,048,869
Rent for leased roads	92,165	85,281	+ 6,883
TOTAL DEDUCTIONS FROM GROSS INCOME .....	3,086,900	2,677,506	+ 409,394
NET INCOME .....	2,015,015	7,473,279	— 5,458,263

**WESTERN PACIFIC.—Annual Report.**—The 1930 annual report of this company shows net deficit, after interest and other charges, of \$304,006, as compared with net income of \$468,693 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
Average Mileage Operated .....	1,565.93	1,554.80	+ 11.13
RAILWAY OPERATING REVENUES .....	\$16,298,580	\$17,687,895	—1,389,314
Maintenance of way .....	2,609,862	3,173,069	— 563,207
Maintenance of equipment .....	2,641,269	3,262,187	— 620,917
Transportation .....	5,953,313	6,068,116	— 114,803
TOTAL OPERATING EXPENSES ..	13,152,838	14,438,042	—1,285,203
Operating ratio .....	80.70	81.63	— .93
NET REVENUE FROM OPERATIONS ..	3,145,741	3,249,852	— 104,111
Railway tax accruals ..	1,113,278	1,287,402	— 174,124
Railway operating income	2,032,004	1,961,124	— 70,879
Equipment rents—Net.	345,826	273,441	— 72,385
Joint facility rents—Net.	224,582	266,950	— 42,368
Non-operating income .....	2,221,590	2,531,225	— 309,034
GROSS INCOME .....	4,253,594	4,492,350	— 238,755
Rent for leased roads	3,600	3,600	.....
Interest on funded debt	2,612,667	2,449,658	+ 163,008
TOTAL DEDUCTIONS FROM GROSS INCOME .....	4,557,601	4,023,656	+ 533,944
NET INCOME .....	* 304,006	468,693	— 772,699

\* Deficit.

### Dividends Declared

Canadian Pacific.—Ordinary, 3¼c, quarterly, payable June 30 to holders of record June 1.  
Georgia, Southern & Florida.—First Preferred, \$2.50, semi-annually, payable May 29 to holders of record May 15.  
Chicago & North Western.—Common, \$1.00, quarterly; Preferred, \$1.75, quarterly, both payable June 30 to holders of record June 1.

### Average Prices of Stocks and of Bonds

	May 12	Last week	Last year
Average price of 20 representative railway stocks.	73.06	74.69	127.41
Average price of 20 representative railway bonds..	92.76	*91.96	93.77

\* Corrected

## Railway Officers

### EXECUTIVE

#### W. D. Robb, Vice-President of Canadian National, Retires

W. D. Robb, vice-president of the Canadian National in charge of telegraphs, colonization, natural resources, radio, insurance, etc., will retire on June 30, after the completion of 60 years of active service, as announced in the *Railway Age* of May 9, page 938. Upon his retirement the vice-presidency occupied by Mr. Robb will be abolished, and the various departments of which he has charge will be allocated to the jurisdiction of other officers in the National System. D. E. Galloway, assistant vice-president, assumes jurisdiction over the C. N. R. telegraphs, effective immediately; Walter S. Thompson, director of publicity, jurisdiction over the radio activities of the company, and D. C. Grant, vice-president, finance department, over



W. D. Robb

insurance. The colonization and natural resources activities will be under the jurisdiction of the president's office.

Mr. Robb was born on September 23, 1857, at Longueuil, Que., and was educated at Sherbrooke Academy, Sherbrooke, Que., and Richmond College, Richmond, Que. He began his railroad career in July, 1871, as an apprentice in the motive power department of the Grand Trunk (now part of the C. N. R.), and in May, 1874, he was transferred to Montreal, completing his apprenticeship at that point. In February, 1883, he became night locomotive foreman, serving in that capacity first at Port St. Charles, and later at Belleville, Ont. In January, 1897, he was appointed master mechanic at London, Ont., and nine months later he was assigned a similar position at Toronto, Ont. In 1901, Mr. Robb was appointed acting superintendent of motive power at Montreal, and in the fol-

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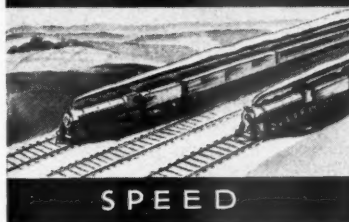


# an important contribution to

## **TRANSPORTATION TECHNIQUE**



PORTER SERVICE



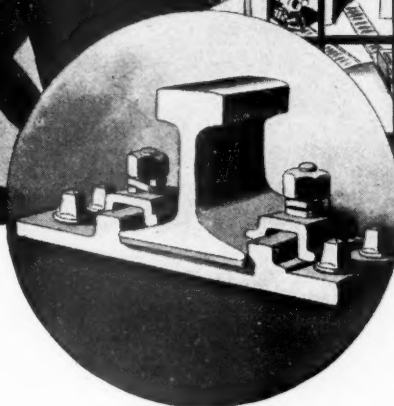
SPEED



DINING CAR SERVICE



MORE TRAINS



**S**MOOTH RIDING, with its guarantee of greater passenger comfort and satisfaction should be reason enough to dictate the selection of G E O — the modern track construction. Yet this is only one of its many advantages. Practically noiseless track, control of rail movement, reduction in rail wave motion, longer life of rails and ties, radically reduced maintenance costs, greater speed, heavier loads, greater safety . . . these are other advantages which account for the immediate acceptance of G E O in many European

countries. In Germany alone, where G E O was introduced five years ago, more than 7900 miles of G E O track have already been laid and new construction is going on at the rate of 1800 miles per year! Here in America, test sections on leading railroad systems are demonstrating its exceptional merit.

G E O is the outstanding contribution to transportation technique in the past decade. Descriptive literature will be sent at your request, and Carnegie Engineers are at your service at all times.



**CARNEGIE STEEL COMPANY - PITTSBURGH**

Subsidiary of United  States Steel Corporation

135

# TRACK CONSTRUCTION



lowing year he became superintendent of motive power. In 1917, he was appointed vice-president in charge of the motive power and car departments; in 1918, he became operating vice-president of the system; in 1922, vice-president and general manager, and, in February, 1923, he was appointed to the position he is holding at the present time.

## FINANCIAL, LEGAL AND ACCOUNTING

**Charles C. Huff**, general solicitor of the Missouri-Kansas-Texas of Texas, has also been appointed general solicitor of the Missouri-Kansas-Texas, with headquarters as before at Dallas, Tex.

**T. B. Van Brunt** has been appointed acting chief claim agent of the Denver & Rio Grande Western, with headquarters at Denver, Colo.; temporarily succeeding **Adam Darling**, who has been granted a six months' leave of absence.

**E. M. Williams**, assistant treasurer of the Gulf, Mobile & Northern, has been elected treasurer-assistant secretary, with headquarters as before at Mobile, Ala. **V. L. Thompson** has been appointed assistant treasurer, succeeding Mr. Williams.

**Norman S. Buckingham**, who was recently appointed general counsel of the New York, New Haven & Hartford, was born in Milford, Conn., on April 30, 1881. He entered railway service with the New Haven as a clerk in the law department in 1898, after graduation from high school, and in 1905, he was appointed chief clerk. While serving in the capacity of chief clerk, he studied law, and in 1912 was admitted to the bar in Connecticut; shortly thereafter, he was ap-



Norman S. Buckingham

pointed assistant attorney. He continued in that position until 1916, when he was advanced to assistant solicitor, and two years later he was appointed counsel for Connecticut. In 1923, Mr. Buckingham was appointed assistant to vice-president, and in 1924, he was ad-

vanced to assistant general counsel, the position he held until his recent promotion.

## OPERATING

The position of assistant superintendent of the St. Joseph division of the Chicago, Burlington & Quincy at St. Joseph, Mo., has been abolished and **R. F. Ledford**, who held that position, has been assigned to other duties.

**H. M. Mayo**, superintendent of safety of the Texas and Louisiana lines of the Southern Pacific and editor of the Southern Pacific Bulletin, covering the activities of those lines, with headquarters at Houston, Tex., retired from active service on May 1.

**W. O. Tracy**, assistant superintendent of the Pocahontas division of the Norfolk & Western, who was recently appointed superintendent of that division, with headquarters at Bluefield, W. Va., was born in Winchester, Ky., on May



W. O. Tracy

25, 1885. Mr. Tracy was educated at Kentucky University, and began his railroad career with the Norfolk & Western on November 17, 1905, as a rodman in the engineering department on the Pocahontas division. In September, 1906, he was appointed levelman, and in November of the following year, he was promoted to inspector on the Norfolk division. He resigned from the service in August, 1908, but returned in March of the following year as a rodman. Mr. Tracy was appointed transitman in October, 1911, and was elevated to the position of assistant resident engineer on the Pocahontas division in August, 1913. He was promoted to resident engineer on the Radford division in September, 1915. In September, 1919, he was given the position of assistant superintendent of the Pocahontas division, and has held that position until his recent advancement.

**W. O. Franklin**, who was recently appointed superintendent of the Radford division of the Norfolk & Western, succeeding **R. H. Smith**, promoted, was born at Martinsville, Va., on September

25, 1874. He received a public school education, and entered railway service with the N. & W. in July, 1892, as a brakeman on the Scioto division. In July, 1897, he was made freight conductor, and in March, 1904, was appointed assistant trainmaster of the same division.



W. O. Franklin

From July to September, 1904, he again served as freight conductor, but during the latter month resumed his duties as assistant trainmaster, serving in that capacity until May 12, 1908, when he was promoted to trainmaster of the Scioto division. Mr. Franklin was transferred to the Pocahontas division as trainmaster on December 1, 1912. He was promoted to division superintendent on January 1, 1918, serving in that capacity on the Pocahontas division until his recent transfer to a similar position on the Radford division.

**R. H. Smith**, formerly superintendent of the Radford division of the Norfolk & Western, who has been appointed gen-



R. H. Smith

eral superintendent, succeeding **James T. Carey**, retired, as announced in *Railway Age* of May 2, page 890, was born in Baltimore, Md., on March 10, 1888. Mr. Smith received his higher education at the Tome School at Port Deposit, Md., and Princeton University, graduating



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# ILLINOIS

## TRACK MATERIALS



from the latter in civil engineering in June, 1911. He commenced his railroad career in 1910, serving as axeman in the engineering department of the N. & W. at Roanoke, during a summer vacation while attending college. He re-entered the service of the N. & W. in June of the following year as a masonry inspector in the engineering department. On February 1, 1912, he was appointed transitman in the engineering department, which position he held until June 1, 1913, when he was promoted to assistant roadmaster of the Radford division with headquarters at Pulaski and Roanoke, Va. On October 15, 1914, Mr. Smith was advanced to roadmaster of the same division. A further promotion came in June, 1917, when he was appointed assistant superintendent of the Pocahontas division. In October, 1919, he was transferred to the Radford division in the same capacity, being promoted to the position of superintendent of the Radford division on December 26, 1922. He has served in that capacity to date.

Mr. Carey, who has retired from the position of general superintendent, was born in Montgomery County, Va., on April 4, 1861, and began his railroad career with the Atlantic, Mississippi & Ohio (now part of the N. & W.) as a water boy when he was 10 years of age. He served in that capacity during summer vacations while attending school, and at the age of 17, when he had finished what was the equivalent of a high school education, he became section laborer at Big Tunnel, Va., (now Montgomery). In March, 1881, when the A., M. & O. was taken over by the Norfolk & Western, Mr. Carey was promoted to section foreman on the Radford division of that road. For a few months the following year he served as locomotive fireman and later as locomotive engineer, which position he held until May 15, 1898, when he was advanced to road foreman of engines on the Pocahontas division. From 1902 to 1905, he served successively as assistant trainmaster and trainmaster of the same division. In 1905 Mr. Carey became assistant superintendent of the Pocahontas division. He held that position until July 1, 1907, when he was appointed superintendent of the Shenandoah division. On March 1, 1910, he was transferred to the Scioto division in the same capacity. Mr. Carey was promoted to general superintendent in charge of the western general division with headquarters at Bluefield, W. Va., on January 1, 1918, and on February 16, 1923, he was transferred to Roanoke, Va., as general superintendent of the eastern general division, the position he held until his retirement.

## TRAFFIC

**A. G. Mathews**, traveling passenger agent for the Chicago, Burlington & Quincy at Cleveland, Ohio, has been promoted to general agent at the same point.

**J. C. Glendinning**, assistant manager, tariff and ticket bureau, has been appointed manager of the tariff and ticket bureau of the Canadian Pacific, with headquarters as before at Montreal, Que., succeeding **G. C. Wells**, who will act in an advisory capacity for a year before taking his pension. Mr. Glendinning has been in the service of the Canadian Pacific since August, 1905, entering its employ as a clerk in the general passenger department at Winnipeg, Man.

**D. F. McDonough**, traffic manager on the St. Louis-San Francisco at Birmingham, Ala., has been promoted to executive general agent at that point, a newly created position. **T. H. Banister**, general agent at Memphis, Tenn., has been promoted to traffic manager at Birmingham to succeed Mr. McDonough. **M. W. Dunkin**, traveling freight and passenger agent at Memphis, has been promoted to general agent at that point, succeeding Mr. Banister.

## PURCHASES AND STORES

**J. R. Ummel**, office manager of the Alaska Railroad, with headquarters at Seattle, Wash., has also been appointed purchasing agent.

**C. S. Jones**, division storekeeper of Stockton division of the Southern Pacific at Tracy, Cal., has been transferred to the Shasta division at Dunsmuir, Cal., succeeding **C. J. Pearce**, who has been transferred to the Western division at Oakland Pier, Cal. Mr. Pearce succeeds **W. I. Short**, who has been assigned to other duties.

## SPECIAL

**Trevor L. Jones** has been appointed agricultural agent of the Chicago & Illinois Midland, with headquarters at Springfield, Ill., succeeding **E. W. Rush**, who has resigned.

**Ray J. Maxwell**, assistant manager of advertising of the Missouri Pacific Lines, has been promoted to manager of advertising, with headquarters as before at St. Louis, Mo. In the *Railway Age* of May 9 Mr. Maxwell was erroneously reported as having been appointed manager of advertising of the Wabash.

## ENGINEERING AND SIGNALING

**F. W. Kasten** has been appointed chief engineer of the Detroit, Toledo & Ironton, with headquarters at Dearborn, Mich.

**E. H. Peck**, district engineer of the Missouri district of the Chicago, Burlington & Quincy, with headquarters at St. Louis, Mo., has been appointed district engineer of the newly created Central

district, with headquarters at Burlington, Iowa. **G. A. Laubenfels**, district engineer of the Iowa district at Burlington, has been assigned to other duties. **G. F. Hamilton**, district engineer of the Wyoming district, with headquarters at Alliance, Neb., has been appointed district engineer of the newly created Western district, with headquarters at Lincoln, Neb.

## MECHANICAL

**A. H. Hoffman**, assistant general air brake inspector and district road foreman of engines of the Southern Pacific, with headquarters at Los Angeles, Cal., has been appointed road foreman of engines of the San Joaquin division at Bakersfield, Cal.

The jurisdiction of **H. L. Needham**, general master mechanic on the Illinois Central at Chicago, has been extended to include the Burnside shops at Chicago. **D. W. Saunders**, master mechanic of the Chicago terminal, has been transferred to Vicksburg, Mass., succeeding **S. R. Mauldin**, who has been appointed general foreman, locomotive department, at Vicksburg. The jurisdiction of **F. P. Nash**, master mechanic of the Burnside shops, has been extended to include the Chicago terminal.

## OBITUARY

**Gerard Van Tassel**, assistant to general superintendent of the New York Central, with headquarters at New York, died at his home in White Plains, N. Y., on May 9. Mr. Van Tassel was 75 years of age. He had been connected with the New York Central for 59 years, entering its employ as a telegraph operator.

**Leslie G. Pearson**, district storekeeper on the Southern Pacific at El Paso, Tex., died in that city on May 7 from injuries received when he was struck by a broken emery wheel on a portable electric grinder. Mr. Pearson was standing about 6 ft. from the grinder at the time of the accident and died shortly afterward.

**Meritt L. Phelps**, assistant to general superintendent of the Denver & Salt Lake, with headquarters at Denver, Colo., died at Denver on May 8. Mr. Phelps, who was 63 years of age, was born at Lottsville, Pa. Following his entry into railway service in 1885, he served successively as brakeman on the Chicago, Burlington & Quincy; as conductor, assistant superintendent and general superintendent of the Colorado Midland, and as general superintendent of the Denver & Salt Lake, occupying the latter-mentioned position from 1917 to 1925.

**HOT SHOT SWITCH HEATER**.—A four-page folder describing the Hot Shot Switch Heater, which utilizes electrically-heated air to melt snow and ice has been issued by the Louisville Frog, Switch & Signal Co., Louisville, Ky.